

Flight, January 14, 1911

FLIGHT

First Aero Weekly in the World.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

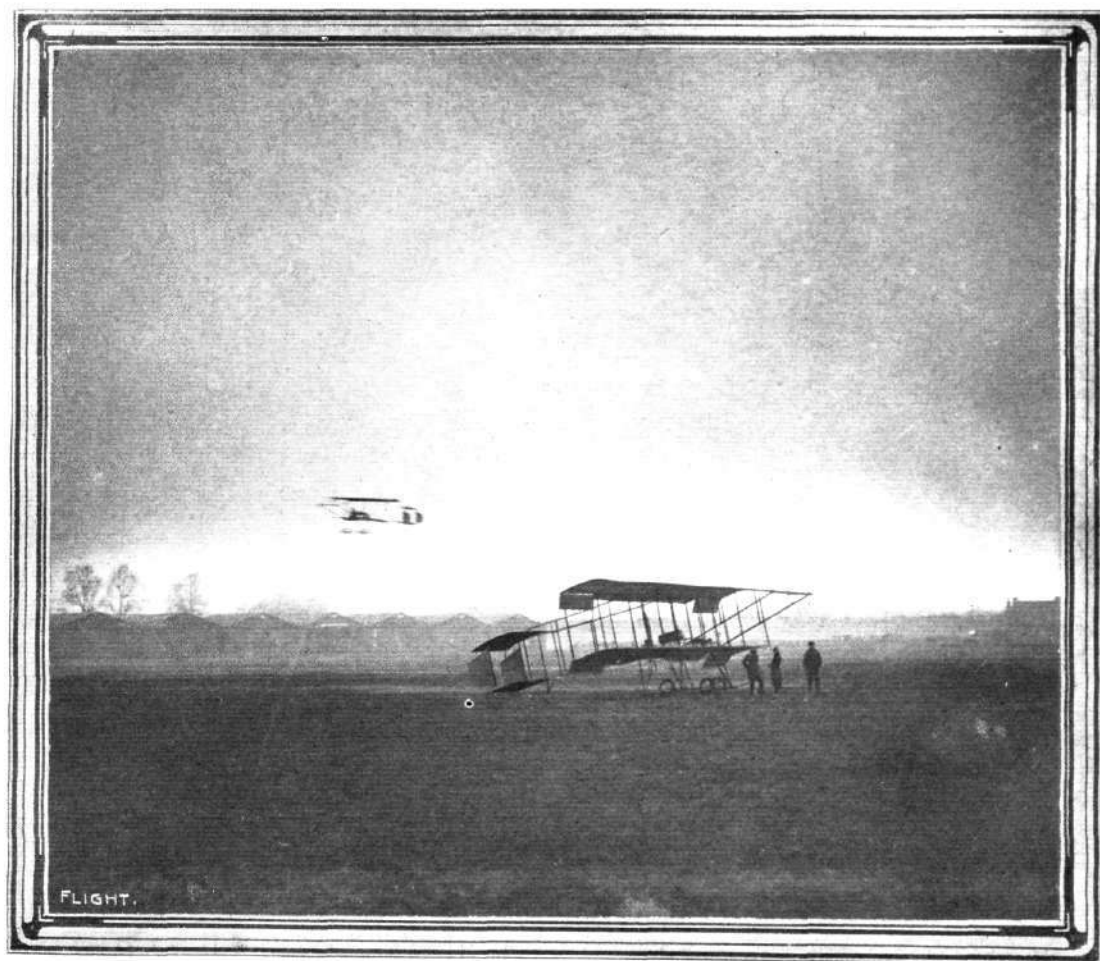
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AT BROOKLANDS—FLYING AT DUSK.—Mr. Durocq, on the Hewlett and Blondeau Henry Farman biplane, passing over Mr. Blondeau's machine at rest on the aerodrome.

THE ADVISORY COMMITTEE AND ITS WORK.

ONE of the latest Parliamentary papers issued and presented to both Houses is the Interim Report of the Advisory Committee for Aeronautics, full details of which we give elsewhere. It is, as may there be judged, an interesting document in itself, and still more so if regarded—as we think in fairness it should be—as an earnest of the invaluable results that may be expected later. Criticism of Government Departments is a national privilege, and besides official work does seem to have a habit of lending itself thereto on the score of slowness; but it remains to be seen whether or not that undertaken by the authorities at Bushey House, at the instance of the Advisory Committee, is to prove a further confirmation of the general rule, for whatever may be thought of the present rate of progress, it must at least be remembered that the full swing of work is only just getting under way down there, and that unduly to hurry the initial stages of experimental work is to court inaccuracy from the start.

So far as can be seen from this Interim Report, various tests are at present being carried out that should provide a good deal of practical information. A fair indication of their nature and of the results is to be found in it, as for instance, where the striking advantages of proofed silk over rubber fabric in the matter of permeability to the leakage of hydrogen gas are dealt with, though little in the way of numerical data are included. Another interesting statement on the same subject is to the effect that the capacity for holding hydrogen on the part of rubbered fabric seems to be generally dependent on the weight of the rubber in the fabric. Proofed paper has also been tried but found useless, which result is incidentally a confirmation of the early observations of Cavendish, Cavallo and the ingenious Dr. Black, who many years ago had in mind the construction of a hydrogen balloon for demonstration before a class of his chemistry students, but seemed always to be deterred from making the experiment because he could never get his butcher to provide the allantois of a calf at the precise time that he happened to be giving a lecture on the subject of gases. All these early workers found that hydrogen passed through paper like a sieve; had they not done so the hydrogen balloon might have been *un fait accompli* before even Montgolfier made his famous discovery of a new "gas" in smoke, which turned out to be nothing but hot air after all.

But most of these matters relate essentially to dirigible balloons and we have still to await developments in any directions that may serve a useful purpose in aeroplane design. There exists, however, at Bushey House a wind tunnel from the use of which many missing links in the science of aerodynamics ought to be forthcoming within a reasonable period. And there is also a whirling table whereon small model propellers can be tested in flight. At Barrow, Messrs. Vickers Sons and Maxim have an enormous plant of the same description whereon full-sized propellers may be tested in flight; and the authorities in the two places have agreed to co-operate in their work as far as possible, particularly with a view to evolving a coefficient necessary to equate the results obtained from models with those derived from full-sized propellers of which the models are small-scale replicas. The firm in question, although a private concern, depend so largely upon Government patronage that in a sense it is impossible to regard many of their undertakings as other than of a national character.

It is at any rate satisfactory to find that the only two experimental plants in this country capable of dealing with propellers in this way are to be operated more or less in conjunction with one another. Some not very far-seeing people have been inclined to ridicule the whirling table at Bushey House and affect to despise the results of small-scale work altogether. But that is little more than sheer folly. Small-scale work may or may not be of vital utility; if it is, it would be ridiculous to ignore it on the grounds of its miniature proportions. Lord Roberts argues that it would be possible for this country to make herself into a nation of sharpshooters by regular practice with a miniature rifle. By an attentive study of the action of models it is certainly possible to learn something of the science of flight that might not be readily within reach on a full scale any more than it is feasible for every would-be marksman to practise shooting at a real live gentleman in khaki in his back yard. Preconceived notions are, of course, open to the abuse of being held as convictions without confirmation, but a preconceived notion is for all that a thoroughly useful asset in any practical work provided that the investigator holds an open mind for the reception of further developments and has in the first instance obtained his notions from some plausible evidence such as that obtained from the investigation of models. For the striking work that it is hoped to obtain from the National Physical Laboratory it is, however, necessary for the moment to wait patiently.

Another department of activity referred to in the report that is particularly strong, mainly owing to the very able work of Dr. Stanton and Mr. Dines, is that associated with meteorology and the investigation of atmospheric disturbances. The latest development in this department is the erection of a new observation station at Pyrtan Hill, in Oxfordshire, where Mr. Dines is investigating the relative conditions of the upper and lower air strata. Work there has hardly settled down as yet, however, and about the only practical result so far deduced is one that has already been appreciated by aviators to the effect that gustiness of the wind decreases with altitude. The fact that what may be described as academic research should happen to provide its first piece of knowledge in the form of somewhat stale news should not, however, in any way be regarded as a reflection upon the useful work that can be—and doubtless will be—accomplished.

But, the above references are one and all to a section of the Interim Report that is obviously of minor importance for the time being inasmuch as the great bulk of the publication in question is devoted to the official results of the Alexander Prize Competition for flight engines. It will be remembered that Mr. Patrick Y. Alexander offered a prize of £1,000 to encourage the development of motors suitable for aeroplanes, and it is indeed regrettable that his most praiseworthy intention should have miscarried to the extent that it has. On this subject, however, we have more to say in our introduction to the Interim Report itself on a later page this week. But it is perhaps well to draw attention here to the fact that the full results of the trial as set out in this official Blue-book now make their first appearance, although the tests themselves were made and the bare net upshot was announced some little time ago.

INTERIM REPORT OF THE GOVERNMENT FLIGHT OFFICE AND OFFICIAL RESULTS OF THE ALEXANDER COMPETITION.

THE second Blue Book on Aeronautics, which forms an interim report of the Advisory Committee for Aeronautics on the work for the year 1910-1911, mainly deals with the Alexander Prize Competition for Flight Engines. In the Autumn of 1909 Mr. Patrick Y. Alexander offered a prize of £1,000 for the best motor for aeronautical purposes which should satisfy certain conditions, the most important of those being that it should pass a satisfactory endurance test. Originally the prize was offered under the joint auspices of four bodies, including the Royal Automobile Club, Royal Aero Club, The Aeronautical Society, and the Aerial League. Subsequently, however, and so far as we are aware without any formal notice of such limitation, the trial was held under the sole auspices of the Aerial League, for which body the actual tests were carried out by the authorities of the Government Flight Office at Bushey House. The appearance of the results of the tests in the form of an appendix to the above mentioned interim report is the first official notice that has been issued on the subject since the original terms of the trial were made known.

Six firms originally entered their motors for trial, three only actually competed. The prize was withheld from award on the grounds that no competitor fulfilled the conditions. Of the three competitors the Wolseley Co. and the Humber Co. both suffered mishaps to their engines that placed them definitely out of the competition. The Green engine, however, completed the required twenty-four hours continuous test, but only approximately developed 31.5-h.p. during this period, whereas the authorities interpret the regulations to specify the necessity of developing 35-h.p.

If Messrs. Green's Motor Patent Synd., Ltd., feel any dissatisfaction at not having the performance of their engine recognised in a more substantial manner, they would appear to have some *prima facie* cause for discontent, for it is certainly open to argument that the rules do or do not imply that the competing engine shall be disqualified if it does not develop 35-h.p. The clauses affecting the question are as follows:—

Horse-power.—The motor to be designed to give 35-h.p. The machine will be required to reach this h.p. on a preliminary run.

Test under constant brake moment.—Before the commencement of the test the maker will be required to declare the speed at which the motor will develop 35-h.p. The tests will be made at a constant brake moment calculated from the h.p. and this declared speed.

It is, of course, perfectly clear that the engine has to show itself capable of developing 35-h.p., and that the conditions under which it will have to work during the trial will be such as are based on the assumption that it can develop 35-h.p. The mere fact, however, that it is prominently specified that the power in question must be developed on a preliminary run at any rate leaves it open to the implication that the exact value would not be insisted upon during the entire 24 hours test. It is a matter, of course, on which the authorities reserve the right of final decision, but inasmuch as the prize was presumably intended to encourage manufacturers of flight engines, and inasmuch as no one has received that material assistance therefrom, it would seem to be only fair to give this one firm at any rate full credit for what they did. It did not need the Alexander Competition to show that flight engines are not altogether so invariably satisfactory as we feel perfectly confident they will become when the makers have had a little more time to grapple with the difficult problem involved. On the other hand, these very same engines, and we may add particularly the Green engine, have distinctly furthered the progress of aviation in England, so that behind this academic turning down of the motor in question by the authorities controlling the trial, there still stands out the altogether more important practical fact the Green engine has done and is doing thoroughly good work on actual flying machines and has incidentally just carried off the British Michelin Cup. So much at any rate for the attitude of the Aerial League and its interpretation of encouragement towards British industries; what the generous donor of the prize thinks about the matter may be best judged from the fact that he has presented the makers with a cheque for £200. Below we give the official results of the trial of the Green engine:—

Description of Engine.

General.—This engine has four separately mounted cast steel cylinders, machined inside and out, of 105 mm. bore, with a stroke of 120 mm. The water jacket consists of a thin copper helmet, the joint with the cylinder at its lowest end being by a rubber ring fitting into a groove in the cylinder, so that the expansions of

cylinder and helmet are independent. The cylinders are mounted on an aluminium crank-case, the holding-down bolts being carried through to serve as supports for the crank-shaft bearings.

Valves.—The valves are of the mushroom spring-closed type, in detachable cases. Each valve is enclosed within a small dome, having an orifice through which the valve is actuated by the end of a short tappet pin. The cam-shaft is carried in bearings in a small oil-tight horizontal casing, divided into halves, and is rotated by an encased vertical spindle situated in front of the engine. This spindle is driven by a pair of worm-wheels from the crank-shaft. The rocking levers are pivoted in extensions of the cam-shaft case, their striking ends being provided with adjusting screws, and the ends operated by the cams with rollers.

Carburettor.—This has no float chamber, and its action is independent of the inclination of the engine. It is of the single jet type, and has automatic air control.

Ignition.—The ignition is by high-tension magneto.

Cooling.—The engine is water-cooled, the circulation being effected by a gear pump.

Lubrication.—The main oil channel is cast solid with the crank-case, and from this oil is forced by a small gear pump through leads at right angles communicating directly with each of the hollow columns through which the holding-down bolts pass, and thence to the main bearings and crank-shaft, the latter being hollow. By this system the use of separate pipes is dispensed with.

Bearings.—The crank-shaft is provided with bearings between each throw, and is slightly offset from the centre line of the cylinders. The ball race is designed to be used with either a propeller or a tractor.

Weight as defined in Regulation 4.—219 lbs.

Results of Trials.

24 hours' endurance test.—The erection of the engine was commenced on October 5th, but, owing to unavoidable delay, the preliminary run was not made until October 17th. The endurance test was commenced at 10.30 a.m. on October 18th. The engine did not run very satisfactorily during the first hour, owing to difficulties with the ignition, and after one hour's run a stop of ten minutes was made, during which new sparking plugs were fitted. On re-starting, the engine ran much better, and continued making approximately 31.5-h.p. at 1,213 revolutions per minute, until the completion of the 24 hours' run on October 19th. The only attention to the engine during this period was the addition of 42 pints of oil 17 hours after the commencement of the trial, and an additional 21 pints 22 hours after the commencement of the trial.

Other tests.—The maximum h.p. which could be maintained for seven minutes was determined on the same day without any overhauling of the engine, with the exception of grinding in the valves. The horse-power obtained was 36.4 at 1,390 revolutions per minute.

To test the effect of the gyroscopic action of the propeller a couple of 50 foot-pounds in a vertical plane was applied to the motor shaft for three minutes while the engine was running, but no effect on the speed and torque could be detected.

To determine whether the engine would work satisfactorily when tilted about an axis transverse to the shaft, two runs of an hour each were made on the engine when tilted at an angle of 15°, first one end, and then the other end, being uppermost. The competitors did not wish to run their engine at full load during this test, and maintained the h.p. at approximately 18 throughout both trials. The engine ran steadily in both cases, but it was noticed that the exhaust was decidedly smoky, apparently indicating over-lubrication.

The general steadiness and freedom from vibration of the engine when running were so marked that it was not considered necessary to test it when running and placed on elastic supports.

On the completion of the trials the engine was dismantled, and the working parts thoroughly examined. Very little wear could be detected in the crank-shaft and connecting-rod bearings, and the state of the cylinders and valves appeared to be quite satisfactory. The ball races of the thrust bearing at the propeller end of the crank-shaft were, however, considerably worn. In the crank-shaft bearings one of the aluminium caps was cracked right through for about one-third of its length. It was not certain that this crack had originated during the National Physical Laboratory tests, as there was some evidence that it existed before these trials began, but it appeared probable that the crack had become larger during the tests. In the case of one of the connecting-rods, it was found that the sleeve inside the small end of the rod had rotated, so that

Tabulated Results of the Trials.

The first line in the table gives the figures laid down in the regulations for the competition.

A.—Endurance tests.

Engine.	Gross run.	No. of stops.	Total duration of stops.	Net run.	Weight of engine alone.	Moment of inertia of fly-wheel.	Mean speed, r.p.m.	Mean b.h.p.	Total water carried in radiator.	Total water evaporated.	Petrol per b.h.p. per hour.	Oil per b.h.p. per hour.	Gross weight of engine, with oil, fuel, cooling water, and containing vessels for a 6-hour run.	Weight of engine alone per mean b.h.p.	Gross weight per b.h.p. for 6-hr. run.
	h. m.		h. m.	h. m.	lbs.	ft. lb. units.			lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	
Wolseley ...	24 0	3	0 30	—	245	1'17	—	35	32'0	6'0	0'632	0'082	453'2	6'69	12'52
"	3 2	0	0 0	3 2	242	0'13	1,445	36'2	32'0	40'0	0'613	0'115	457'2	6'95	13'14
Humber ...	17 41	7	2 18	15 23	—	—	1,420	34'8	32'0	16'7	0'553	0'251	472'9	6'18	12'51
Green ...	11 32	1	0 2	11 30	234	0'61	1,230	37'8	35'8	3'0	0'503	0'282	431'6	6'96	13'71
Green ...	24 0	1	0 10	23 50	219	0'26	1,212	31'5	38'0	—	—	—	—	—	—

Remarks.—Humber engine: 12½ pints of oil added 7 hours after commencement of test, and 50 pints after 8 hours.

Green engine: 42 pints of oil added 17 hours after commencement of test, and 21 pints after 22 hours.

Note.—The petrol was supplied to the laboratory by Messrs. Carless, Capel and Leonard, and was described as their standard petrol of S.G. 700.

the oil-way to the pin was blocked up, and, further, the gudgeon-pin had moved sideways and was rubbing against the sides of the cylinder.

B.—Maximum brake horse-power developed on run of seven minutes.

Engine.	Duration.	B.H.P.	Speed—revs. per min.	Remarks.
Green ...	7 mins.	36'4	1,390	The following readings were obtained with throttle fully open:— Speed. B.H.P. 1,295 35'0 1,350 35'8 1,390 36'2 1,470 37'1

C.—Test of engine with moment of 50 ft.-lbs. applied to crank-shaft in a vertical plane, to represent the gyroscopic action of the propeller in steering.

Engine.	Duration.	Remarks.
Green ...	3 mins.	No apparent effect on speed or torque.

D.—Trials run with the axis of the shaft inclined at an angle of 15° to the horizontal.

Engine.	Conditions.	Duration.	Remarks.
Green	Propeller end up	1 hr.	In these tests the power was absorbed by a water-cooled rope brake. The H.P. developed was approximately 18 in each test. The engine ran quite smoothly in both trials.
	Propeller end down	1 hr.	

Ease of starting.

No starting devices were supplied to any of the engines sent in, so that for the purpose of starting the engines the dynamo was connected to the laboratory mains and used as a motor.

There was no difficulty in starting any of the engines tested, and they may be said to be equally good in this respect.

Security against fire.

Wolseley.—Nothing in design and construction to find fault with in this respect. No leak or accumulation of petrol observed.

Humber.—Reasonable security against fire. No leak or accumulation of petrol observed.

Green.—Reasonable security against fire. Radiator mounted on wood strips. No leak or accumulation of petrol observed.

Air resistance.

Wolseley.—Air resistance somewhat high, due to honeycomb form of radiator.

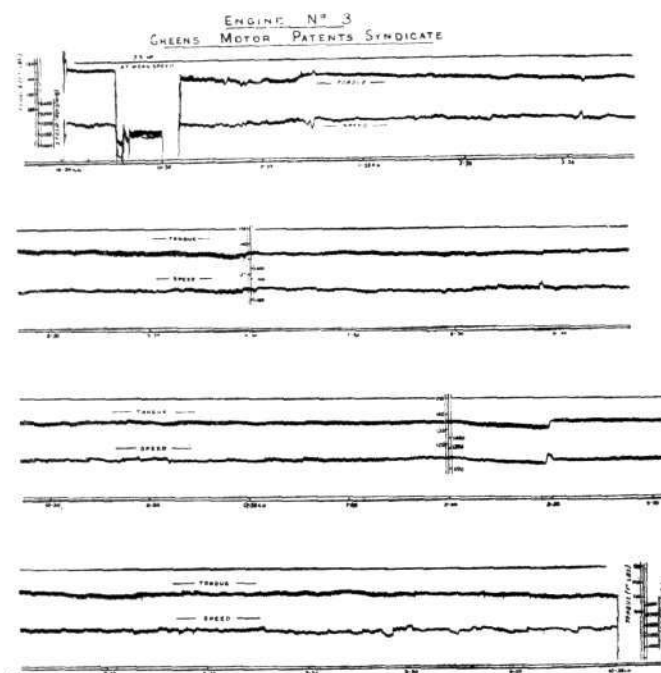
Humber.—Air resistance high, due to abnormal size of radiator.

Green.—Air resistance low, due to excellent design and distribution of radiator surfaces oblique to air current.

The Autographic Records of the Speed and Torque during the 24 Hours' Trials.

In the case of the Green and Humber engines, at the speeds at which the trials were made, there was more vibration of the torque pen than in the case of the Wolseley engine, which ran at a higher speed. This should be taken into account in interpreting the diagrams.

Some notes as to the possible causes of the fluctuations occurring are given with the diagrams. These are taken from the test sheets and represent the view taken by the observer at the time, but it



Speed and torque records of Green engine.

must not be assumed that in every case the supposed cause was the true or only cause of the variations. The notes are reproduced in the hope that they may be of some assistance in the interpretation of the records.

The field of the generator was excited from the bus bars of the Laboratory, which were occasionally subject to changes in voltage due to throwing off machines. A few momentary fluctuations on the speed and torque curves due to this cause will be found on the diagrams, and are indicated in the notes.

A line is drawn on each diagram to indicate the value of the torque, at the mean speed, corresponding to 35-h.p.

Description of the Testing Plant.

Under the conditions of the competition the motors were to be tested with open exhaust, and in an air current moving at approximately 30 miles an hour relative to the engines. The principal test was an endurance test of 24 hours' continuous running at 35-b.h.p., so that considerable care was necessary to ensure that the appliances required for producing the air current, transmitting and absorbing the power, and for measuring the torque and speed should be capable of continuous working for a run of this magnitude.

The motor under test was erected on rails in a galvanised iron testing box 7 ft. by 6 ft. by 6 ft. high, one side of which communicated with the 4 ft. by 4 ft. air duct containing the fan, and the

opposite side to a vertical discharge pipe 6 ft. by 4 ft. in cross section. The electrically driven fan for producing the air current was fixed to the inlet on the west wall of the testing house. In the 4 ft. by 4 ft. duct between the fan and the testing box a Pitot tube was fixed communicating with a water gauge inside the testing room, so that continuous observations of the velocity of the current could be made throughout the test. The other sides of the box were detachable for the purpose of erecting the engine, and were provided with windows for observing the motor. The connections to the throttle and ignition were carried through the side of the box, so that during the test the testing box could be kept closed.

Estimation of the Speed of the Motor.—The speed was measured in two ways; one by the direct reading of a counter at stated

tests. This brake was of the ordinary type, and consisted of a mild steel flanged disc specially fitted with spring balances and ball thrust bearings to work in an inclined position.

End Thrust.—To apply the required end thrust of 175 lbs. a bell-crank-lever was mounted on a shaft in bearings bolted to the testing

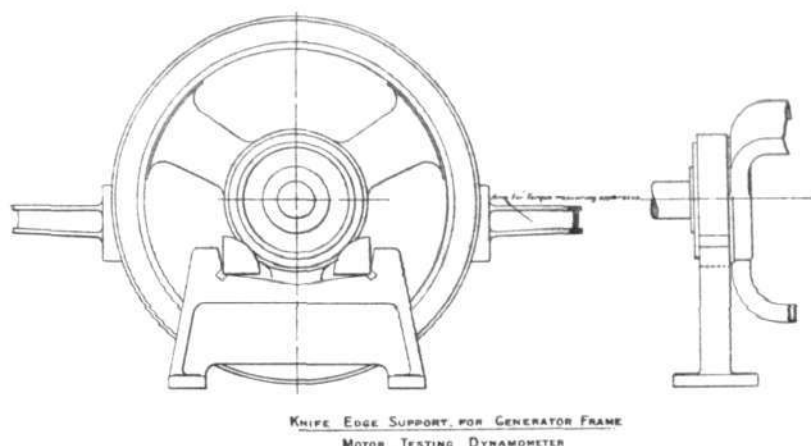


Fig. 1.

The testing plant.

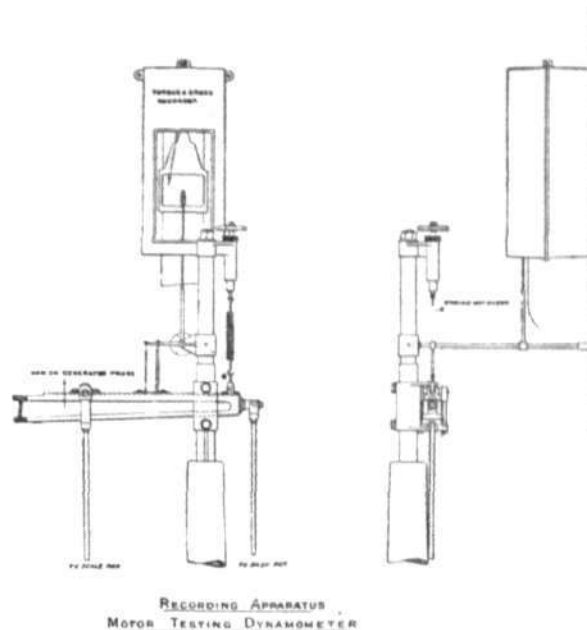


Fig. 2.

intervals, and the other by an Elliott speed recorder worked from a magneto fixed to the shaft of the engine. The recorder was mounted at the top left-hand side of the switchboard. The time scale of the instrument was 12 in. per hour, and the pen indicated fluctuations of 0.5 per cent. of the mean speed.

Estimation of the Brake Horse Power.—The crank-shaft of the motor was connected through a flexible coupling to the shaft of a 50 kilo-watt generator mounted on knife edges, which formed a very sensitive dynamometer. The method of suspension of the generator on the knife edges will be clear from Fig. 1. For this purpose the end bearings were provided with hardened steel rings which were in rolling contact with the steel knife edges as shown.

As this method of supporting a generator used as a dynamometer is apparently new, it may be stated that the difficulties experienced in constructing and setting up were quite small, and that the device gave no trouble whatever during the 24 hours' test. It was thought that the generator might move endways due to any small axial force on the armature, and to prevent this small rollers in ball bearings were fixed to the frame and in contact with the steel rings on the casing. It was found, however, that this precaution was needless, as there was no tendency for the machine to move endways.

The lever of the dynamometer is provided with a dash-pot for damping the oscillations, and a scale pan for the dead load, which was adjusted to the mean torque required.

For the purpose of recording the fluctuations of torque, the end of the lever arm was connected to a cast-iron pillar by means of a spiral spring, so that the varying tensions of this spring, recorded on a rotating drum, were a measure of the amount of the fluctuations. As the motion of the lever arm was limited to $\frac{1}{4}$ in. it was necessary to devise a multiplying gear of 6 to 1 to work the pen. For convenience this pen was fitted so that it should be in contact with the paper on the drum of the speed recorder. The whole arrangement is shown in Fig. 2. By this means it was found possible to obtain a complete record of the fluctuations of speed and torque throughout the whole trial.

Absorption of the Power Developed.—For this purpose special resistance mats were used. By using a combination of these mats in parallel, adjusted by means of the switches on the board, it is possible to regulate the power absorbed to $\frac{1}{20}$ th of a horse-power. These mats are not specially air-cooled in any way, and proved perfectly satisfactory for a 24 hours' run.

Tests with the Engine Tilted.—Under the conditions of the competition, tests of one hour duration had to be made with the shaft of the engine inclined at an angle of 15° to the horizontal, first with one end up and then the other. As the difficulties of using the generator with its axis inclined would have been considerable, a special water-cooled rope brake was made for the purpose of these

tests. The vertical arm of this lever was forked, and carried two $\frac{1}{4}$ -in. Hoffmann ball bearings, the outer collars of which fitted into a recess in the half of the flexible coupling nearest the engine. It may be noted that these bearings gave no sign of heating when running at 3,500 r.p.m. for 24 hours continuously.

The estimation of the petrol and oil was by direct weighing of the supply tanks before and after the trial. At the conclusion of the trial the water content of the jacket and radiator was measured, and the loss during the trial estimated. The engines were then taken down and weighed, and afterwards opened up and examined for signs of wear.

The Interim Report.

With respect to the interim report proper of the Advisory Committee, the eight pages of text is mainly devoted to telling Mr. Asquith that everything is progressing very satisfactorily at Bushey House, the only actual facts that evolve are the following:—

Permeability Tests.

In the rubbered fabrics the capacity for holding hydrogen seems to be generally dependent on the weight of rubber in the fabric. It is possible that diagonally doubled rubbered fabrics are superior to parallel doubled, but this cannot be definitely asserted without further investigation. Some samples of proofed silk tested have shown a hydrogen containing capacity equal to that of the best and heaviest rubbered cloths, with a greatly lower weight. The excellence of goldbeater's skin in this respect was shown by the figures previously published. Paper, sized and unsized, has been tested, but hydrogen passes through it with great readiness.

Some tests have been made to determine the variation in permeability with rise of temperature. The rubbered fabrics tested have shown a somewhat rapid increase of permeability, while a proofed silk gave a slightly lower permeability at the higher temperature. The permeability of goldbeater's skin was found to increase slightly with temperature rise. The effect of low temperatures will also be investigated.

Other Tests of Fabrics.—Durability tests have been made by exposure of samples in the open to sun and weather. After weathering, the samples are subjected to tensile and permeability tests. After an exposure of fifty days proofed silk and rubbered cotton fabrics showed a loss of strength not very different in amount in the two materials. The permeability of the rubbered fabrics, however, very greatly increased, while some of the samples of proofed silk showed actually a decreased permeability. One sample of proofed silk taken down for test on a cold day showed a permeability much larger than that of the other samples, probably due to crumpling at a somewhat low temperature; when re-exposed in the sun the permeability of this again decreased. Goldbeater's

skin deteriorated considerably with exposure both in strength and hydrogen holding capacity.

Tests of rubbered fabrics have also been made under exposure to ultra-violet light, and deterioration observed. The tests are being continued, and the effect of protective colouring is being investigated.

Tests to determine the amount of moisture absorbed by fabrics under different conditions have also been made, and have given useful information. The tests are included in the series of tests now usually applied to fabrics which are being subjected to a thorough examination.

All the above tests will be repeated on the best of the rubbered fabrics previously examined, and on other promising materials such as the proofed silk which has been referred to, and it is hoped that the figures obtained in these and the earlier tests may be included in a full account of the work done on fabrics to be issued later.

Meteorological Research.—For the further study of wind structure researches have been undertaken at Pyrton Hill, Oxfordshire, by Mr. J. S. Dines, with a mechanical assistant, under the direction of the Meteorological Office. The locality has been selected because the work can be carried out there in conjunction with the investigation of the upper air for the Meteorological Office, which is in charge of Mr. W. H. Dines, F.R.S.

The immediate object of the researches is to find out, by means of careful examination of instrumental records of various kinds, how far up the ordinary gustiness of wind extends, to trace whatever evidence can be obtained of vertical motion or rotary motion in the atmosphere, and to identify the conditions in which such motion exists.

In order to test for gustiness above the surface, apparatus has been designed which registers simultaneously the pull of a kite wire, with the fluctuations therein due to gusts, and the length of wire paid out. From the latter, with a knowledge of the vertical angle, the height of the kite can be approximately determined. A few records have been obtained, and in these the diminution of gustiness with height is clearly apparent.

For the identification of rotary motion a new model of the Dines pressure tube anemograph has been constructed to record both direction and velocity upon the same drum—an indispensable requirement. The recording part has also been remodelled in order that the trace may represent the combinations of variation of velocity with that of direction. The apparatus is completed and works well. It has been erected with a vane at a height of 35 ft. above the ground, to begin with. A considerable number of diagrams have been obtained from it, mostly for light winds. The fluctuations as recorded show, for the most part, little trace of the combination of variations in velocity and direction which would correspond with rotary motion; changes in velocity and direction take place independently and spasmodically, but in a few cases the sequence of changes is more orderly. No doubt much depends upon the character of the locality and the type of weather. Working drawings have been

made of the essential parts of the apparatus so that corresponding observations can be set on foot elsewhere for the study of the effect of locality.

For the study of vertical motion, self-recording gear has been designed to be fitted to a theodolite so that a single observer can attend to the instrument and obtain a record of the variations of the azimuth and altitude of a pilot balloon. With two such theodolites the path of the balloon can thus be determined both as regards its horizontal and its vertical motion. Two instruments have been constructed, both of which work well, and balloons have been followed by them to heights of about 2,500 ft. The balloons used in these experiments have been toy balloons costing only 6d. and 1s. respectively. The possibility of following successfully the flight of these small balloons makes this important mode of observation available for many useful aeronautical purposes at very reasonable cost. The second theodolite has only recently been completed, and only a few ascents have been observed. One of these shows remarkable variations in the vertical velocity of the balloon, which can only be attributed to variations as regards vertical motion in the air currents traversed by the balloon. The results are in every way satisfactory.

The instrumental equipment for the researches contemplated is now practically completed. As regards plant and installation, what are now required are means for exposing the various instruments at suitable heights. This part of the work will be proceeded with as soon as a sufficient number of observations at the present trial levels have been obtained.

Propeller Tests.

Efficiency tests on model propellers up to 2 ft. 6 in. in diameter can now be undertaken in the Aeronautics Division. The diameter preferred is 2 ft. The boss should be left solid, and should have an axial length of not more than 1½ in. Right-handed propellers are preferred.

Up to the present time provision has only been made for propeller speeds up to 1,800 r.p.m., and driving power up to ½-h.p. Provision is being made for testing propellers at higher speeds, and the necessary equipment is now nearly completed. The following will be the limiting conditions:—

Propeller speed not greater than 4,000 r.p.m.

Propeller torque not greater than 20 inch-lbs.

Speed of translation not greater than 3,000 ft. per minute.

It should be understood that these tests will be undertaken in rotation, and that, while the Department will do all that is possible to avoid undue delay in carrying out the work, tests for the Government Departments must take precedence of all others.

Applicants should state the precise speeds of translation corresponding to the speeds of rotation at which the efficiency is to be determined; and the fees will depend on the number of such observations required.



"IN MEMORIAM."

CECIL GRACE.

He is lost! In the dusk of the evening
The Goodwins have seen his last flight;
Then the mists hid his path, while around him
Came stealing the arms of the night.
He is lost to the joy of the sunlight,
The glory of life and its zest;
But he finds what the whole world is seeking—
A well-honoured rest.

He is lost! When the feet of the morning
Made rosy the slumbering sea,
The planes that she yesterday smiled on
Had vanished for ever. And he—
He was lost to the world that laments him,
And lost to the realms of the air;
But he finds the true source of all knowledge
In kingdoms more fair.

He is lost! For the white planes that bore him
So bravely have failed him, alas!
The sea is the grave that enclosed him,
The winds sang his requiem Mass.
He is lost! And the hearts that have loved him
Are weeping, with longing and pain;
But we know, when all losing is over,
We find him again.

He is lost! 'Mid the waste of the waters
He sleeps, in the flower of his youth,
But we know when his spirit awakens
It will be to the fulness of truth.
Feathered songsters, spread swiftly your pinions,
And there, where the young hero lies,
Pay your homage to one who excelled you
As lord of the skies.

DOROTHY M. HAWARD.

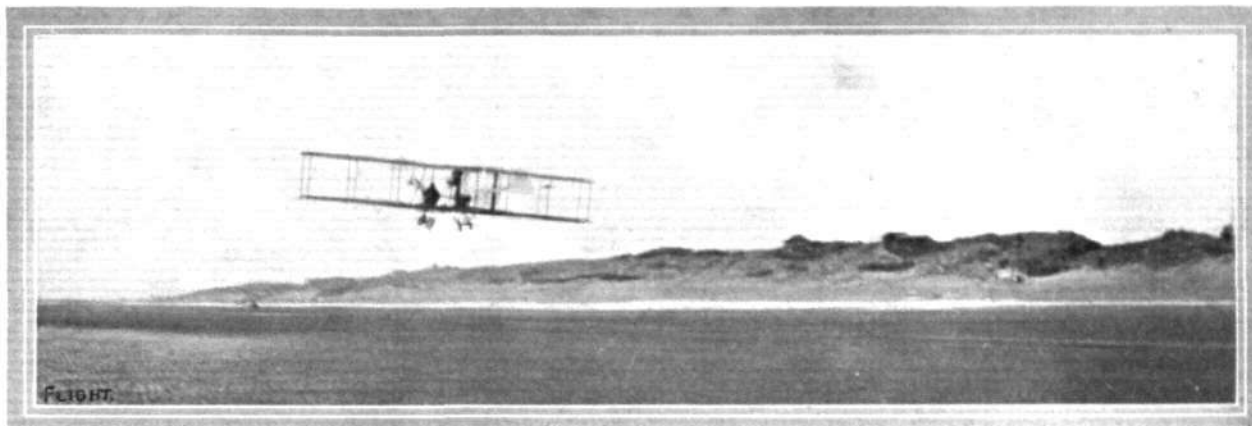


To Encourage Marine Aeroplanes.

THE recent attempts in connection with the Baron de Forest prize have once more brought into prominence the importance of having an aeroplane so fitted that in the event of anything going wrong with the motor it may be possible to remain afloat after contact with the surface of the water.

In this connection it may be remembered that the Aero Club of Nice hold the Coupe d'Aspremont, which will be awarded to the aviator who flies from the California Grounds and alights on the sea by the Jetty Promenade at Nice, afterwards restarting up from there and returning to his starting-point.

BRITISH NOTES OF THE WEEK.



Mr. Alec Ogilvie, on his N.E.C.-engined Short-Wright machine, flying well over the Camber sands during his recent fine flight for the Michelin Cup.

The Fate of Mr. Grace.

UNFORTUNATELY the discovery of a cap and goggles on the Belgian Coast at Mariakerke, near Ostend, seems to confirm only too well the conclusion which has been formed as to the untimely fate which overtook Mr. Grace after his start from the French coast. From the description of this cap and goggles there seems no doubt that they were those worn by Mr. Grace, as Mr. G. C. Colmore, who was with him when they were purchased, recognised their description.

In view of the tragic disappearance of his friend, the wedding of Mr. Colmore to Miss Phyllis Fellowes, which was to have taken place last week, was postponed.

The Gordon-Bennett Race.

As will be seen upon reference to the official notices of the Royal Aero Club on page 33, the Federation Aeronautique Internationale decided at its meeting in Paris on Tuesday last that broadly the original rules for the Gordon-Bennett Aviation Trophy should be adhered to, so that for this year the course will be over a closed circuit and for a distance of 150 kiloms. (94 miles). It had been suggested by the British Club that the course should be a cross-country one, but this apparently did not meet with the approval of the other countries represented.

The Statue of Liberty Prize.

It will also be seen from the R.Ae.C. Official Notes that the Federation decided to request the Aero Club of America to reconsider its decision regarding the Statue of Liberty Prize. It was held that the revision of the rules made by the club after Mr. Grahame-White's attempt was not in accordance with the F.A.I. regulations.

Audax Compressed Air Engine.

FOR the benefit of numerous enquirers for particulars of the Audax compressed air engine, our correspondent, who first drew attention to this engine in letter 1002, has promised to furnish us with a full description of it, which we hope to publish shortly in **FLIGHT**.

Lectures on Aeronautics.

IN addition to the course of lectures in connection with aeronautical engineering which are being given at the Regent Street Polytechnic, a further series of about 15 lectures has been arranged to be given by Mr. L. B. Desbleds on Wednesday evenings at 7.30. The first lectures will be devoted to the methods of estimating the various stresses and strains to which the different parts of an aeroplane may be subjected.

"The Art of Aviation"

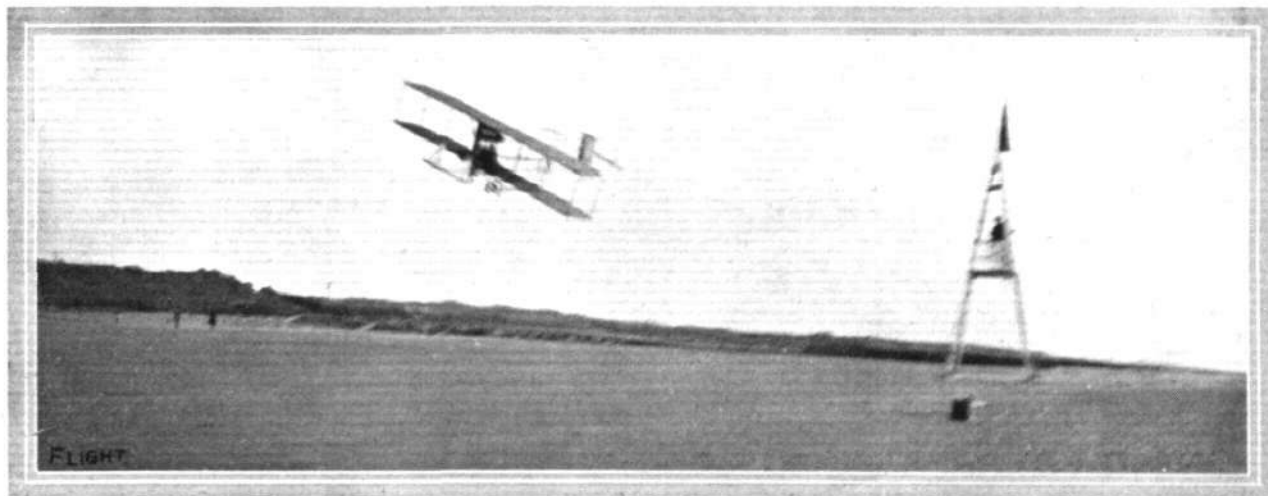
Is the title of a lecture which Mr. R. W. A. Brewer has arranged to give at the London Institution, Finsbury Circus, E.C., on the 30th inst. The lecture will be illustrated by lantern slides and experiments.

Madame Frank Returns Home.

HAVING recovered sufficiently from the results of the accident at Boldon Racecourse last August, Madame Frank was able on the 4th inst. to leave the Sunderland Infirmary and to travel back to her home in France.

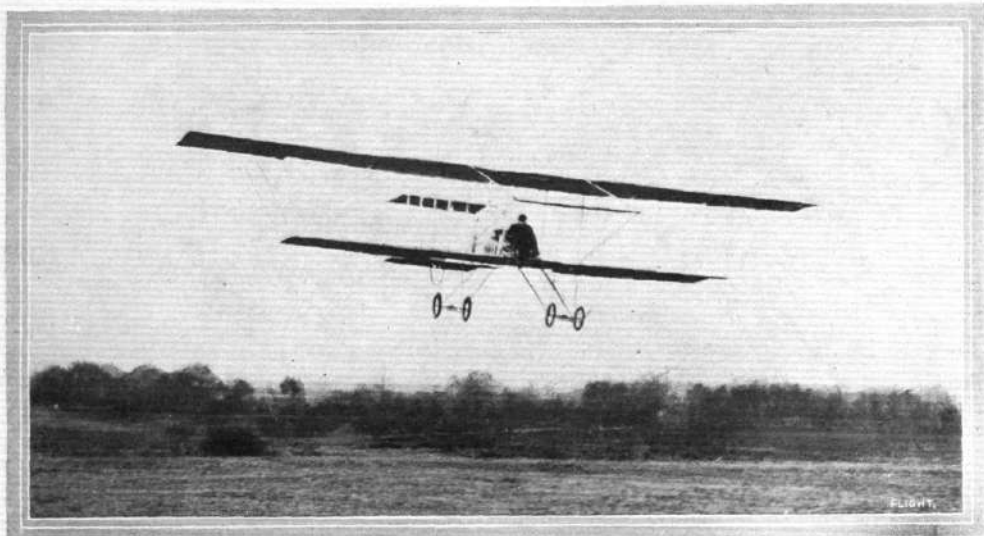
For Insurance Note Change of Address.

THOSE of our readers who are interested in insurance matters should note that the business carried on by Mr. W. T. Dolamore will in future be carried on under the title of W. T. Dolamore and Co., and the offices have been transferred from 7, Fenchurch Avenue, E.C., to 199, Piccadilly, W.



Another view of Mr. Alec Ogilvie rounding one of the mark towers during his flight for the Michelin Cup on his N.E.C.-engined Short-Wright biplane.

FROM THE BRITISH FLYING GROUNDS.



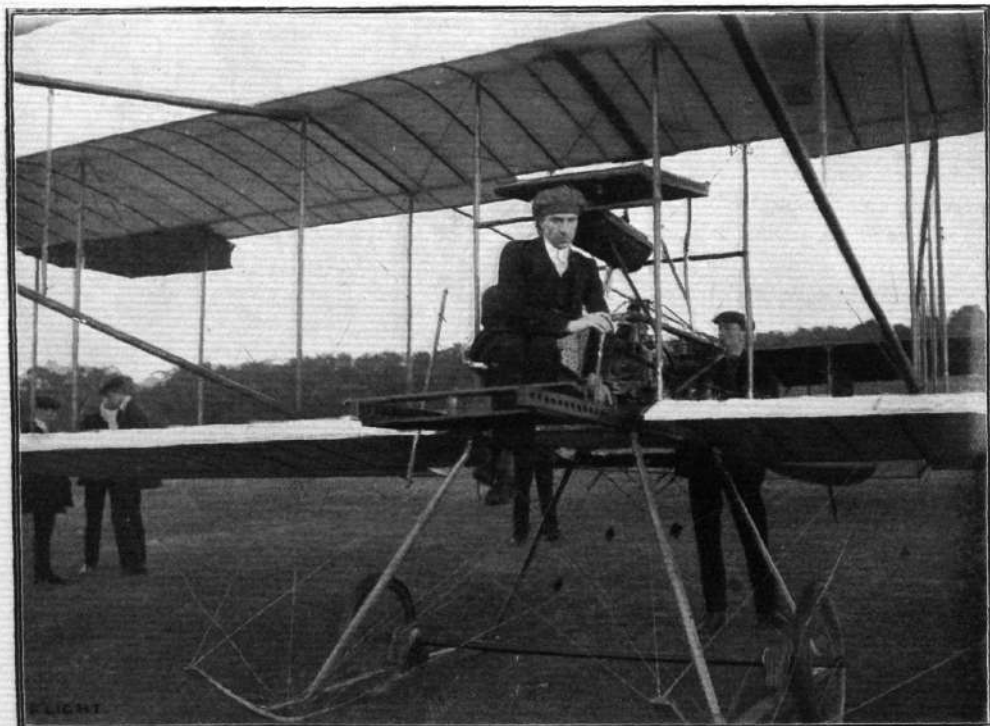
Capt. Burke in flight at Aldershot on the British Army Farman biplane during the first successful flight and before the mishap to the machine.

Laffan's Platin.

THE Farman machine which was purchased by the War Office was delivered at the balloon factory, South Farnborough, last week.

Capt. Burke, who gained his certificate in France, also arrived to pilot the machine.

On Saturday morning Capt. Burke, R.E., made his first flight,



THE DE HAVILLAND ARMY BIPLANE.—View showing Mr. G. de Havilland—now a member of the War Office mechanical staff—in the pilot's seat on the occasion of the machine's successful flight at Farnborough on Tuesday last. Readers of **FLIGHT** are well acquainted with the pioneer work carried out by this designer, whose first machine was illustrated in these pages on April 9th, 1910.



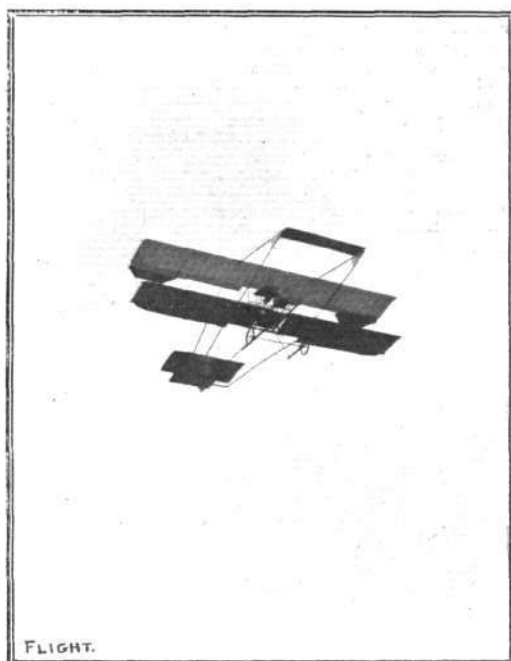
Capt. Burke ready for flying the British Army Henry Farman machine at Aldershot.

but with unfortunate results. He made a very fine flight of about two miles over Laffan's Plain at a height varying from 50 to 80 ft., after which he descended near the balloon factory. A few minutes later he attempted a second flight, but before he had flown 50 yards the machine came down sideways on its right wing. As soon as it touched the ground it swung completely round and smashed to pieces. The machine was a total wreck, and Capt. Burke was nastily injured, one of his feet being crushed.

On Tuesday Mr. De Havilland was out on the biplane designed by himself, and made several good flights. In one of them 10 miles was traversed in a quarter of an hour, his height being about 100 ft.

There are now at the factory four aeroplanes—the Farman, a Bleriot, a Wright, and the English-built De Havilland, which was badly damaged, as mentioned a fortnight ago.

The dirigible shed which was to be used as a hangar for the ill-fated Lebaudy airship is undergoing alteration. The low roof, which was the cause of the unfortunate mishap, is being raised in order that such a catastrophe may not occur again.



FLIGHT.

The De Havilland Army biplane, which emerged from the Army Balloon Factory at Farnborough on Tuesday last, and made a successful initial 10-mile flight, remaining up at about 100 ft. for 15 mins.

Brooklands Aerodrome.

PRACTICALLY no flying was possible on the first days of last week, but on Thursday there was a calm, which was immediately taken advantage of. Blondeau was out on the Farman, accompanied by Mrs. Hewlett, and she occasionally took charge of the machine. Ducrocq was also flying on his racing Farman with a lady passenger. Another machine in the air was Mr. Gibbs' Sommer, piloted by Mr. Astley, who, during a twenty minutes' flight, made several rounds of the aerodrome. Several of the other occupants of the sheds were out on their machines making hops in a straight line. Saturday was also a busy day, there being four or five machines in the air at once. Mr. Astley was again out on the Sommer biplane, and showed his control over the machine by a splendid bit of manoeuvring, which averted



Mr. Eric England in the pilot's seat of the latest Weiss monoplane which he has been flying at Brooklands.

what seemed to be a certain collision. He was following Mr. T. Conway Jenkins on a triplane when the latter came to earth somewhat suddenly. Mr. Astley also began to descend, but finding that he would not be able to stop in time to avoid a smash, very smartly steered his machine between the disabled triplane and a telegraph pole, there being only about a couple of feet clearance. On landing Mr. Astley was complimented upon the promptness of his manœuvring by the other aviators. Lieut. Snowden Smith made several good flights, including one with Mrs. Hewlett as a passenger, and in another he was accompanied by Lieut. F. E. T. Hewlett, R.N. Some very good flying was also seen on Tuesday last when Lieut. Snowden Smith, Mr. Astley, and M. Ducrocq were flying on their biplanes and Mr. Morrison on his Blériot monoplane.



Mr. Blondeau ready to start at Brooklands with Mrs. Hewlett as passenger on their Henry Farman biplane.

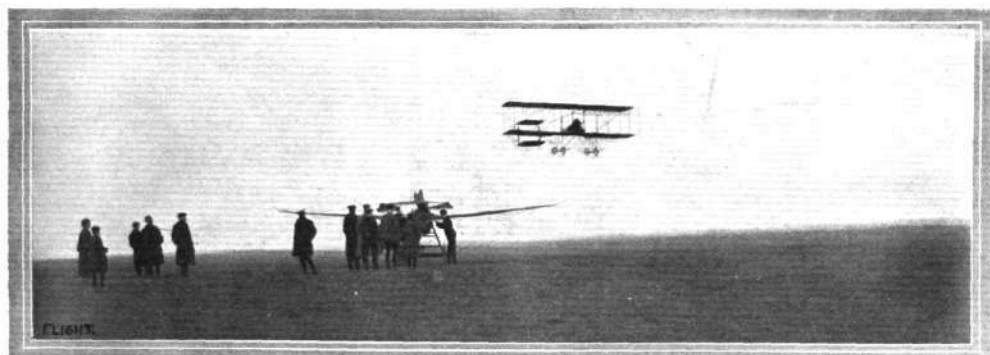
New Forest Aviation School, Beaulieu, Hants.

HAVING got over the Christmas and New Year festivities, serious business is now order of the day, and Mr. Wilson started the ball rolling by practising get-offs and landing at a given spot, rising to various heights to judge his distance. Mr. Poggioli was



Mrs. Hewlett, who is now flying one of the Henry Farmans at Brooklands attached to the Hewlett and Blondeau School. Note the sabots to the right which Mrs. Hewlett finds suitable wear this wet weather.

also out executing circular flights about 30 feet up and is now flying with great skill. On one effort, after doing nearly two circuits, he tried to rise too high at a corner and lost the way on the machine, with the result that he came down with the tail a trifle lower than the front, breaking a long strut.



AT BROOKLANDS AERODROME.—Mr. Blondeau in the air with Mrs. Hewlett in the Hewlett and Blondeau School Farman, flying over Mr. Eric England's Hanriot monoplane.

Mr. Tinline at first was doing long hops but failed to get up nicely until a new propeller was fitted of smaller diameter, when he was able to make long hops 5 or 6 feet off the ground, the length of the straight, about a mile.

Mr. Wils-on was out for three hours on Saturday morning and again in the afternoon doing long straight flights of $1\frac{1}{2}$ miles.

Mr. H. N. Tinline was also out, doing straight flights down the other straight, about 4 ft. up, this machine hardly appearing to be the same since the new propeller was fitted. A slight accident occurred in coming in; the switch was not connected up and the throttle fixing broke, with the result that the engine raced and the men could not hold it back, which says something for the 35-h.p. E.N.V. engine. This occurred very close to the road, which is about a foot lower than the forest, thus effectually stopping by breaking two skid supports and the propeller. This accident raises an interesting point whether it is advisable to have the throttle control opened or closed by a spring, or worked by a rod.



Mr. H. J. D. Astley on his Sommer biplane at Brooklands. —Mr. Astley, on this machine on Saturday, gave a remarkable display of his airmanship when he had to steer between a telegraph pole and Mr. Conway's smashed triplane, with only about 2 ft. clearance to spare.

Salisbury Plain.

THURSDAY of last week was a dull day, but Lieut. Cammel was out on Col. Capper's new Green-engined machine, and after making one or two satisfactory trials a sudden gust of wind turned the machine on its nose, the three front skids being broken. Fortunately Lieut. Cammel was unhurt, and the repairs to the machine did not take very long.

Mr. Carter was out on the new machine which arrived about a fortnight ago, and with the engine running fairly well, the machine made a few hops. From the accompanying photographs it will be noticed that the machine is of the biplane type of very short span, with the upper planes of slightly greater span than the lower ones. There is no elevator in front, but that position is occupied by the engine and propeller. The engine is an 8-cyl. one, made by the Nonpareil Motor Fitting Co. at Birmingham. At present it gives about 60-h.p., but when properly tuned up it is expected to reach

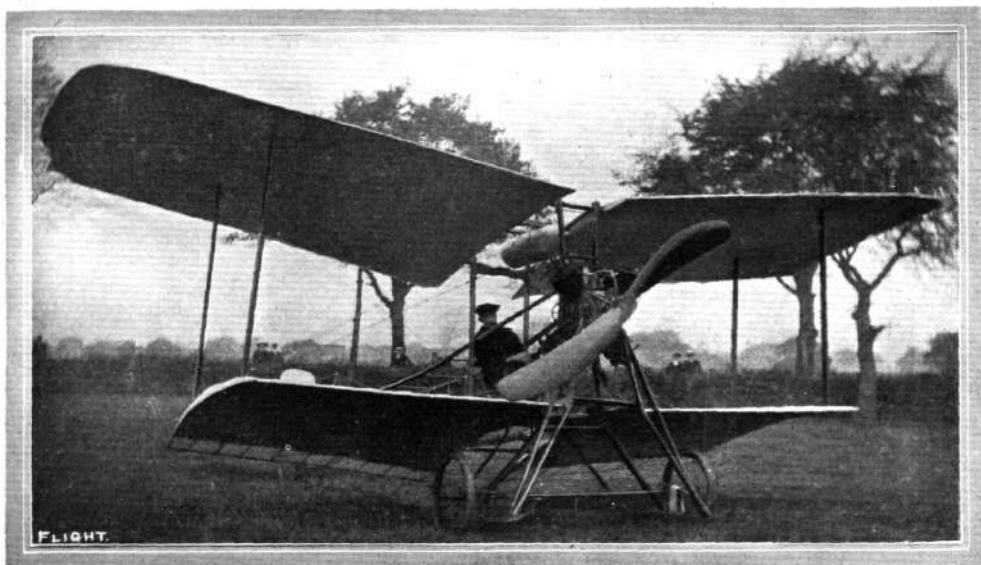


Mr. England on the Hanriot monoplane at Brooklands.

about 80-h.p. On the following day Mr. Carter was out again, and succeeded in getting the biplane off the ground for short distances.



Lieut. Snowden Smith, the Army aviator, on the Hewlett and Blondeau Henry Farman, just after taking Naval Lieut. F. E. T. Hewlett for a 10-mile flight at Brooklands.

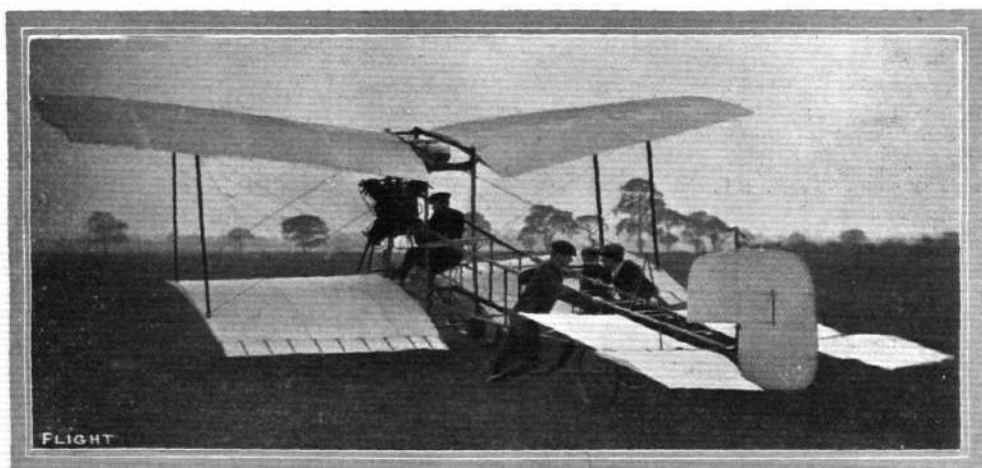


The biplane, with which Mr. Carter has been experimenting at Salisbury Plain during the last fortnight, as seen from in front.

Saturday morning was fine and frosty and Tetard had the Gnome-engined Bristol out before breakfast for a trial run. Afterwards he had the machine at work again and made a good show, flying round Fargo Camp, and, passing at some distance away from the sheds, headed off to Porton and round Salisbury City before returning to the sheds. He landed by a fine *vol plané* after being in the air for some 47 mins., and covering a distance of between 30 to 35 miles, his average altitude being about 1,400 feet. In the afternoon advantage was again taken of the calm weather, and M. Tetard took up one of his pupils and Mr. Manion, an elderly gentleman, who was very delighted with his trip. He was taken to a height of 500 ft., and covered two circles of five miles each. Afterwards one of the Bristol mechanics was taken for a trial run. Tuesday morning was fine but dull when M. Tetard brought out the Bristol biplane in order to give Mr. Gibson a trial flight, after which a group photograph was taken of the pilot and his pupils together with the machine.

Mr. Cockburn had his old Farman out and, after overhauling the engine, made a good flight. Although this machine is one of the first made and has done a lot of real good service it still runs as well as ever. On landing Mr. Cockburn took up his pupil, Lieutenant Conner, R.F.A., for his first lesson. This was the first time the officer had been in the air, and was in fact his first acquaintance with actual flying machines. He was highly delighted with the experience, although he admitted that the journey was a little bit cold. It was interesting to note that the combined weight of the pilot and pupil was 28 stone. After another lesson in the afternoon Lieutenant Conner took charge of the machine himself and made several short flights in a straight line, rising sometimes to a height of 70 ft.

Mr. Carter was also out with his biplane after having made a few alterations to the tail. The machine rises very rapidly, in one case getting off the ground in 15 ft. but no extended flights were made owing to the fact that the engine was not running up to form.



View from the rear of Mr. Carter's novel biplane.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Annual Dinner.

THE ANNUAL DINNER will take place at the PRINCE'S RESTAURANT, Piccadilly, London, W., on TUESDAY, JANUARY 31st, 1911, at 7.30 for 8 o'clock.

The following prizes won during the year will be presented:—

The cash prize of £1,000 attached to the Gordon-Bennett Aviation Trophy to C. Grahame-White.

The Baron de Forest £4,000 prize to I. Sopwith.

British Empire Michelin Cup and cash prize £500 to S. F. Cody.

Royal Aero Club Challenge Cup to Hon. Mrs. Assheton-Harbord.

Members have received a special circular dealing with the annual dinner, and in order to facilitate the arrangements they are requested to notify the Secretary as early as possible if it is their intention to be present. Members may be accompanied by ladies.

Tickets (inclusive of wines, cigars, &c.):—

Gentlemen ... £1 7s. 6d. Ladies ... £1 1s. 0d.

Federation Aéronautique Internationale.

Extraordinary Conference.

New York Aviation Meeting.—The Extraordinary Conference of the Federation Aéronautique Internationale, to consider the protest lodged by the Royal Aero Club against the Statue of Liberty Award, was held on Tuesday, the 10th inst., at the Aero Club of France in Paris. The chair was taken by Prince Roland Bonaparte, President of the Federation. The countries represented and their delegates were as follows:—

Germany—Herr Hiedemann; America—Hart O. Berg, Edgard Mix, Bentley Mott and Henry Cachard; Great Britain—R. W. Wallace, K. C., G. Brewer, V. Ker-Seymer, Claude Grahame-White and H. E. Perrin; Holland—W. Six and Van der Berch Van Heemstede; Italy—Signor Pesce; Argentina—Leon Bahar; Switzerland—Colonel Schaeck; France—Edmond Sirven, Alfred Leblanc, François Peyrey, Ernest Zens, Leon Barhou, Louis Blériot, Rudolphe Soreau, Edouard Surcouf, Comte H. de la Vaulx, Comte de Castillon de Saint-Victor, Secrétaire-General to the F.A.I., was also present.

Mr. Wallace argued the case on behalf of the Royal Aero Club. He lamented the death of Mr. Moisant and paid a graceful tribute to his memory. He then quoted the rules governing the Federation and discussed the reasons for appeals of this nature. He also examined the regulations governing the contest in America, especially those relating to the Statue of Liberty Prize, and contended that, as Mr. Grahame-White had qualified to take part in the race, and Mr. Moisant had not, the decision of the Aero Club of America should be reversed on the ground that Mr. Moisant should have been disqualified from taking part in the contest. Mr. Cachard, an American Advocate, practising at the French Bar, replied on behalf of the Aero Club of America, and produced sworn affidavits in favour of his contentions. After a prolonged discussion it was decided that the American Aviation Committee had no right to change the conditions of the race in violation of Rule 29 of the rules of the Federation Aéronautique Internationale.

The effect of this decision is that Mr. Moisant is disqualified from taking part in the Statue of Liberty Prize, and that the classification given by the Aero Club of America is incorrect. The Federation further decided that the matter should be referred to the Aero Club of America to make a new classification as a court of first instance.

Gordon-Bennett Aviation Cup, 1911.—The special regulations governing this contest for the year 1911 were discussed, and it was decided that the distance should be 150 kilometres on a closed circuit having a perimeter of not less than 5 kilometres.

A vote of thanks to the Chairman, Prince Ronald Bonaparte, was proposed by Mr. Roger Wallace, Chairman of the Royal Aero Club, and unanimously passed.

Gordon-Bennett Aviation Cup.

The Cup, having been won last year by Mr. C. Grahame-White, the nominee of the Royal Aero Club, the race for 1911 will be held in England. The exact date and place will be announced later.

Each Club forming part of the Fédération Aéronautique Internationale has the right of challenging the holder, the Royal Aero Club, and such challenge must be received before March 1st, 1911.

The Committee of the Royal Aero Club will select the three competitors and reserves representing the United Kingdom. Intending competitors are requested to notify the Secretary on or before February 28th, 1911, of their willingness to compete if chosen. Applications must be accompanied by a cheque for £20, the entry fee, which amount will be returned should the competitor not be selected.

Candidates must be members of the Royal Aero Club.

The Aero Club of America has sent in a formal challenge for the International Competition this year. They will be represented by three competitors whose names will be announced later.

Gordon-Bennett Balloon Contest.

The Cup having been won last year by the Aero Club of America, the race this year will be held in America. The exact date and place will be announced later.

Each Club forming part of the Federation has the right of challenging the holder, the Aero Club of America, and such challenge must be sent in not later than March 1st.

The Committee of the Royal Aero Club will select the competitors to represent the United Kingdom, and intending competitors are requested to notify the Secretary on or before February 20th, 1911, of their willingness to compete if chosen. Applications must be accompanied by a cheque for £20, the entry fee, which amount will be returned should the entry not be accepted.

International Aero Exhibition at Olympia.

The International Aero Exhibition held by the Society of Motor Manufacturers and Traders under the auspices of the Royal Aero Club, will take place at Olympia, opening on Friday, March 10th, 1911, and terminating Saturday, the 18th.

Full particulars can be obtained on application to the Exhibition Manager, Society of Motor Manufacturers and Traders, Maxwell House, Arundel Street, Strand, London, W.C., or the Secretary, Royal Aero Club, 166, Piccadilly, London, W.

In connection with the Exhibition it is proposed to organise an exhibit of model flying machines. Space will be given free, and the Royal Aero Club will erect suitable stands and provide the necessary attendants. In order to partly cover this expense a charge of 10s. will be made for each model exhibited. It is proposed to award Medals and Cash Prizes.

HAROLD E. PERRIN.

166, Piccadilly.

Secretary.

PROGRESS OF FLIGHT ABOUT THE COUNTRY.

NOTE.—Addresses, temporary or permanent, follow in each case the names of the clubs, where communications of our readers can be addressed direct to the Secretary. We would ask Club Secretaries in future to see that the notes regarding their Clubs reach the Editor of FLIGHT, 44, St. Martin's Lane, London, W.C., by first post Tuesday at latest.

Aero Models Association (CAXTON HOUSE, WESTMINSTER).

AN open model flying competition, arranged by the South-Eastern Branch of the Association, was held at the Practice Ground, Kidbrooke, on December 31st. Over 30 members and their friends attended, and a dozen different types of models were entered for

competition. A distance race resulted as follows:—1, C. Fleming Williams, 325 yards; 2, H. H. Groves, 280 yards.

The arrangements for the formation of a South-West Metropolitan Branch are actively proceeding. Non-members of the Association living in the south-western district interested in aero models should send their names to the Secretary of the Aero Models Association.

A.A. and M.U. (Aviation Section).

THE presentation of the Motor Union Trophy to Mr. Claude Grahame-White, in commemoration of his gallant attempt to fly from London to Manchester in the spring of 1910, will be made at a luncheon to be held in his honour at the Waldorf Hotel, on Friday, January 20th.

The following is the programme of papers to be read before the members of the Aviation Section of the Automobile Association and Motor Union for the season January-April, 1911:—

Tuesday, February 7th.—“The Work of the School Aero Club,” by R. P. Grimmer.

Tuesday, February 14th.—“Plan Shape of Flying Machines. Its Relation to Control and Longitudinal Stability,” by A. P. Thurston, B.Sc.

Wednesday, March 8th.—“Some Lessons of 1910,” by Major J. N. C. Kennedy.

Tuesday, March 21st.—“The Manufacture, Properties and Use of Elastic Motors,” by F. B. Beringer.

Tuesday, April 11th.—“The British Pioneers of Aviation,” by A. C. Horth.

The papers will, in some instances, be illustrated by lantern. The place of meeting is the Members' Room, Caxton House, and the hour of assembly 8 p.m.

Manchester Aero Club (22, BOOTH STREET).

The club has arranged for a lecture to be given by Mr. A. E. Berriman, on Friday, January 20th, at 7.30 p.m., at the Manchester School of Technology, subject “The Conquest of the Air, and Some of its Problems.” Each member is entitled to two tickets, one for himself and one for a friend.

THIS MONTH'S WEATHER.

WHAT FLYING MEN MAY EXPECT IN JANUARY—GALES, SNOW, FOG.

By T. F. MANNING.

VERY few aviators could answer the question—which are the most stormy, foggy, snowy, cloudy, or rainy months of the year? Yet it is quite obvious that a man's success or failure, perhaps his life or death, may depend on a knowledge of these facts when making his flying plans. As a rule, when making plans some weeks or months ahead, he has very little to guide him except his general knowledge concerning the character of the seasons, which is usually very vague. Of course when the day is at hand he has the forecast of the Meteorological Office. But this comes too late to prevent disappointment, if the weather is unfavourable, and too often we see men taking fearful risks rather than, at the last moment, break through the arrangements they have made.

A better knowledge of the weather to be expected at any given time would obviate many disappointments and considerably lessen the dangers of aviation, and this knowledge is available in the records of weather in the past. Of course it is not possible from these records to predict what weather we will have on any particular day or in any particular week. But the recurrence of weather of certain types shows some approach to regularity. There are certain weeks when we have more gales or snowfalls, more rain, or thunder, or sunshine, than in other weeks; and we can say that in such a week the chances of a gale or a fog are ten in a hundred, while in another given week they are only two in a hundred.

This knowledge of the degree of probability of any weather factor should prove of some help to the aviator making plans for the future. He can see what month in the year, or what period in any month, is likely to offer the most favourable conditions for flying. And, by combining the information given below with the description published daily by the Meteorological Office of the type of weather prevailing (cyclonic, anti-cyclonic, &c.), he can foretell, with tolerable accuracy, the conditions to be expected for several days or a week to come.

The following is based on the records for nearly a hundred years past with regard to some of the phenomena, and for over a hundred years with regard to others. But the figures in the table give the percentage of chances, that is to say they indicate the number of times a gale, fog, &c., occurred on each day during one hundred years. To make this matter quite clear—we have records of some phenomena for over a hundred years, and of others for somewhat less than that period. I have taken the even century and given to it its due proportion of weather events, calculated from these records. We may not have the average weather, thus indicated, in this present year, day answering to-day. But a glance at the table will show that it gives valuable assistance to an aviator planning a flying event; it shows him that there have been, in January, well marked periods of more frequent and less frequent storms, snowfalls, fogs, &c., and the probabilities are that future Januaries will correspond more or less closely to those of the past.

Thus, if we take the six days, January 4th to 9th, we have the chances of a gale as 4, 8, 6, 4½, 5 and 5 in a hundred, respectively, a total of 34½ chances in the six days. Then if we compare with this period the six days, January 22nd-27th, the figures are 10, 8, 11, 10½, 8, and 10½, a total of 59. The probabilities of a gale in this latter period are nearly double of those in the former; the odds against a gale in the first period are 100 to 34½, and in the second period 100 to 59.

We have records for several parts of the country for long series of years, but the table here given applies only to the south and south-east of England, where probably most of the important flying events will be carried off. It is based on Greenwich records mainly.

Table of Weather Phenomena in January.

(The figures show how many times in a hundred years each event occurs. The odds against a gale, fog, &c., on any particular day would be as 100 to the figure in the table.)

Day.	Gales.	Fogs.	Dense fogs.	Snow-falls.	Hail.	Thunder.	Sun rises.	Sun sets.
1	5	13	2½	16	—	—	—	—
2	7½	17	2½	17	—	—	—	—
3	10½	11	2½	17	2	1	—	—
4	7	16	3½	12	3	1	—	—
5	7½	11	1	19	1½	—	—	—
6	6	19	6	17	—	—	—	—
7	4½	17	2½	10	—	—	—	—
8	5	9	2½	15	1	—	—	—
9	5	11	1	15	1	—	—	—
10	10	13	5	11	1½	1	—	—
11	6	9	5	17	—	—	—	—
12	6	16	4½	17	2	—	—	—
13	10	13	2½	11	—	1	—	—
14	10½	16	1	9	1	—	—	—
15	7	7	—	15	1½	—	—	—
16	7½	14	—	12	1	—	—	—
17	6	10	3½	9	1	—	—	—
18	9	18	5	12	1	—	—	—
19	9	14	3½	12	3	—	—	—
20	10½	14	1	13	2	—	—	—
21	6	14	3½	10	1	—	—	—
22	10	14	2½	10	1½	—	—	—
23	9	14	3½	11	1	1½	—	—
24	11	13	2½	11	2	1	—	—
25	10½	15	6	10	1	—	—	—
26	8	9	2½	11	2	—	—	—
27	10½	13	—	10	—	—	—	—
28	7	13	3½	14	4	1	—	—
29	10	11	5	9	1	1	—	—
30	11	8	2½	11	1	—	—	—
31	11	6	—	13	1½	—	—	—
	253½	398	84	396	38½	8½		

It will be seen that January is much more stormy at the end than at the beginning. During the first ten days there are 68 gales in a century; during the second ten days there are 81; and during the third ten days there are 93 gales.

Fogs of all kinds are pretty evenly distributed, but the last few days show a considerable decrease, which is continued into February. Snowfalls progressively diminish in frequency, the numbers for the first ten days being 149, for the second ten days 127 and for the third ten days 107. Hail, being a spring phenomenon, and thunder prevailing chiefly in summer and autumn, the figures for January are quite negligible.

As compared with other months of the year January is the most stormy, although December and March run it very close. It is the coldest month of the year. It has more snowfalls than any other month. In the matter of fogs it is better, but not much better, than November and December, which are the worst months. The first week of January is the most snowy and the last the most stormy week of the whole year. In London more or less rain falls on fifteen days during this month, and there are only 42 hours of sunshine, an average of 1 hour 21 minutes per day. Taking all weather phenomena into account January is probably the worst flying month of the twelve.

FOREIGN AVIATION NEWS.

A.C.F. and Aviation.

At the last meeting of the Committee of the Automobile Club of France MM. Ernest Archdeacon, Commandant Ferrus, Chevalier Rene de Knyff, Count de la Valette, Alfred Loreau, Rene Quinton, Ed. Surcouf, and Count Robert de Vogue, were elected to represent the Club on the Commission Sportive Aeronautique for 1911.

The Commission Sportive Aeronautique.

For 1911 the Commission Sportive Aeronautique (the joint Committee of the French Aero and Automobile Clubs), will be composed of the above named delegates of the A.C.F., together with the following representatives of the Aero Club of France: MM. Leblanc, L. Barthou, G. Besançon, L. Blériot, Count Castillon de Saint Victor, H. Deutsch (de la Meurthe), Count H. de la Vaulx, and R. Soreau. In this new Committee, M. Leblanc and Commandant Ferrus take the place of M. Balsan and the Marquis de Dion, who have resigned. The officials will be President, M. Barthou; Vice-President, M. A. Loreau; Secretary, M. E. Surcouf; Treasurer, M. Deutsch.

Amerigo tries for the Michelin Cup.

APART from the attempts which we chronicled last week as having been made in France on the last day of the old year for the International Michelin Cup, an attempt was also made in Germany at Mulhouse. Amerigo, on his Aviatik machine, determined to try and win the cup, but after he had been in the air for 3 hrs. 7 mins., and covered about 200 kiloms., he was obliged to descend owing to a violent storm of snow, making it impossible to continue.

This Year's Michelin Cup Rules.

IN view of the way in which the record for the Michelin Cup has advanced year by year, it is not improbable that an attempt will be made to have the rules altered for this year, the idea being that the record should be made across country. Up till now the prize has been awarded for the longest distance flown in a closed circuit, the winners being, 1908, Wilbur Wright, 124 kiloms.; 1909, Henry Farman, 234 kiloms.; 1910, Maurice Tabuteau, 584 kiloms.

A Collision at Issy.

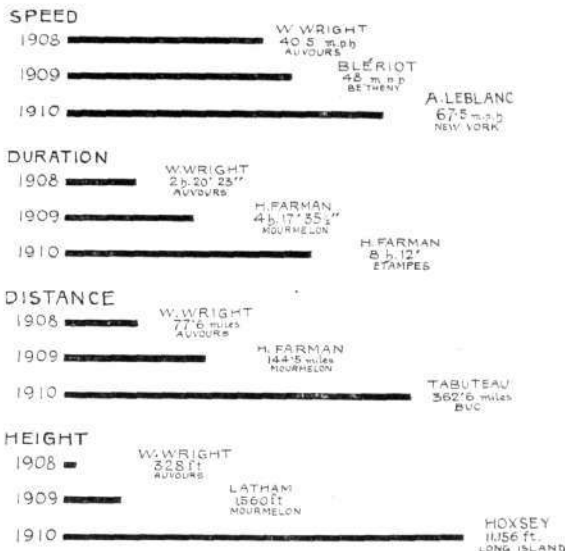
AN incident was witnessed at Issy on Sunday morning when a machine, piloted by a novice, charged into another one piloted by M. Cei, just as the latter was landing after a lengthy flight. With the exception of a sprained wrist, sustained by M. Cei, the aviators escaped without injury, but both their machines were badly smashed.

Flying to the Meet.

AS a digression from the humdrum life of an aeroplane instructor, Bregé, on Sunday morning, flew on his Voisin biplane from Pau to the venue of a meet of the local foxhounds. He circled above the assembled huntsmen but did not land, veering off in the direction of Pau, and after passing over the town, returned to the aerodrome.

Legagneux at Nice.

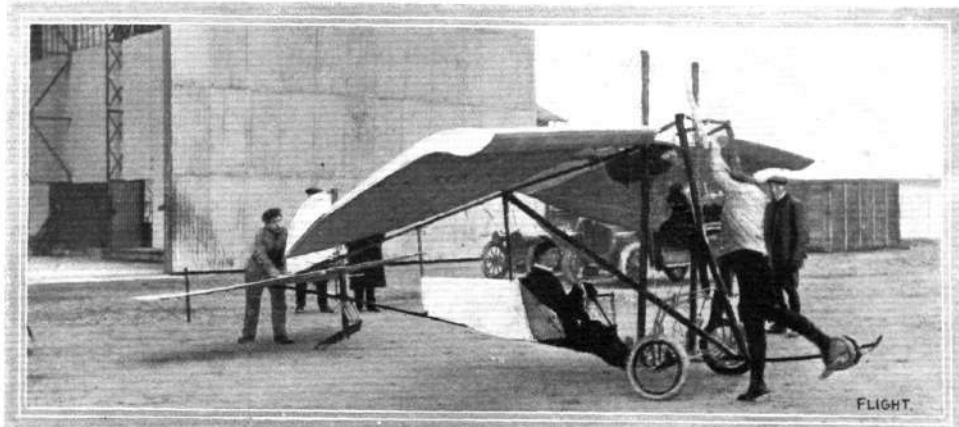
AMONG the attractions at Nice during the next few weeks must be included Legagneux, who in addition to a number of other aviators, has arranged to give a series of exhibition flights, and also to make passenger trips. He will use a Blériot monoplane and also the Henry Farman machine on which he twice attempted to fly from Paris to Brussels and back.



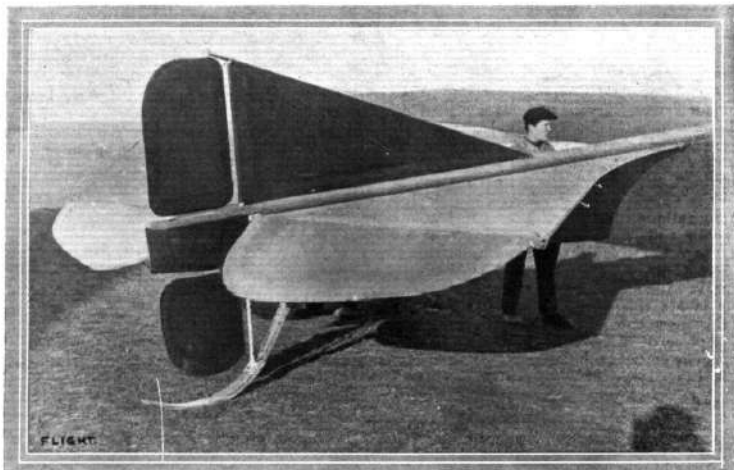
THREE YEARS' PROGRESS IN SPEED, DURATION, DISTANCE, AND HEIGHT.—The above diagram graphically shows the remarkable record advances made in the short space of three years in aviation. It must naturally ease off now with such limits reached as the above, whilst more attention and study will without doubt be given to the perfecting of details and strengthening the parts of machines which have to bear the greatest strains.

At the Goupy School.

BOUVIER, who has met with considerable success as a pilot of Sommer machines, visited Juvisy on Friday of last week, and at his



Kaufmann monoplane, type "Demoiselle," which is being successfully flown at Issy.



R.E.P. MONOPLANE.—Rudder, tail and back skid of the new model.

first attempt made a very good flight on one of the Goupy biplanes. Vedrine also has met with considerable success, and on the same day was flying for one hour, mostly at a height of about 400 metres. Ladougue was using one of these machines before some Russian military delegates, and concluded one trial by gliding down for a distance of 3 kiloms. Bobba, a new pilot of the Goupy School, was also up, and flew with a passenger over the country round Viry and Juvisy.

Bathiat Prefers a Monoplane.

AFTER making extended trials both on monoplanes and biplanes of the Sommer type, Bathiat has decided that his preference is for a single-seater of the former type. On one of these machines he was flying for an hour on the 3rd inst., at a height of about 400 metres, and at the first favourable opportunity he intends to fly from Mouzon to Mourmelon and Rheims and then probably go on to Issy.

Four-seated Blériot Arrives at Pau.

THE four-seated machine which we mentioned in *FLIGHT* some time ago as having been designed by M. Blériot has now been completed. It arrived at Pau on the 6th inst., and will shortly undergo its trials, probably with M. Blériot himself in the pilot's seat.

Trials with the Morane Monoplane.

ON the 6th inst. Aubrun had the Morane monoplane out at Pau, and was flying on it for over an

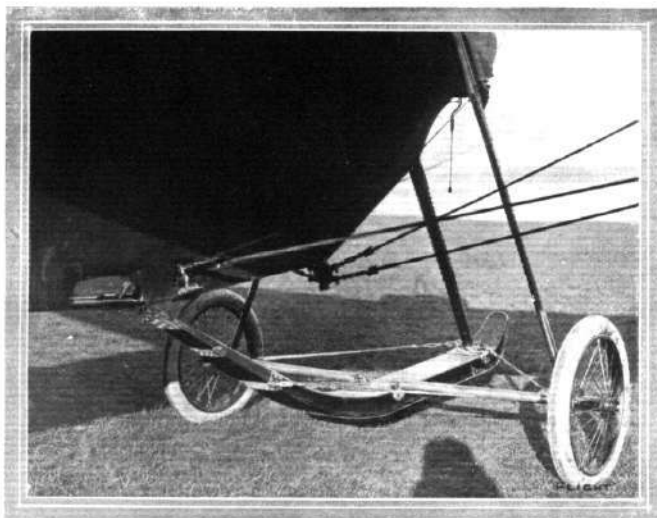
hour, concluding with a spiral glide from a height of 600 metres. He afterwards made a cross-country flight, and then the young Cambridge graduate, Hamel, made the three tests to obtain his pilot's certificate and afterwards flew for some time at a height of 500 metres.

A Lucky Escape.

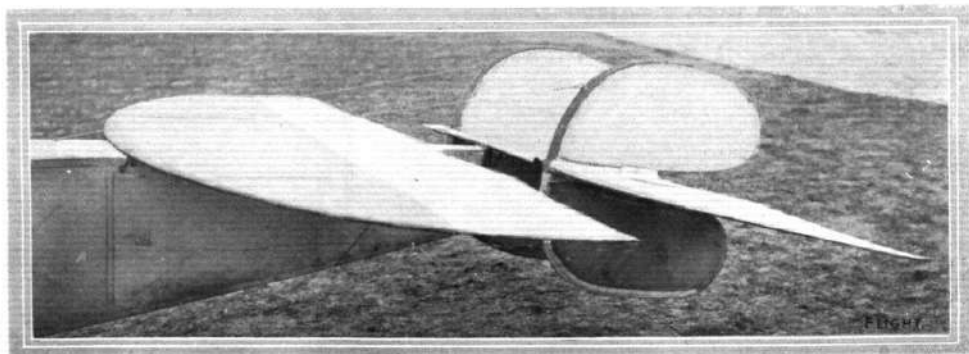
WHILE practising on a Farman machine at Nice on Tuesday of last week, Florencic fell from a height of 300 metres. His machine was smashed beyond recognition, but fortunately the aviator escaped with only slight injuries to his legs.

Kaiser to Review Aviators.

SO far from the recent rumours being correct of disapproval by the Kaiser of aviation, according to an advice from Berlin it seems probable that the German Emperor will shortly hold a review of those officers who have qualified as aviators. Influenced no doubt by the trials made by his brother, Prince Henry, and also by the reports rendered at his request by General Herringen and Baron Lyncker, two of his military advisers, the Kaiser is taking a very active interest in the progress of aviation. It is probable



R.E.P. MONOPLANE.—Chassis and landing skid of latest model.



NIEUPORT MONOPLANE.—The rudder and tail of the latest model.

that aeroplanes will be called upon to play an important part in next year's military manoeuvres.

Wright Biplane with a Single Propeller.

On the 5th inst. at Johannisthal, Thelen was trying a Wright machine in which the usual arrangement of two propellers had been replaced by a single one placed centrally. The machine was of the latest type, with the elevator placed at the rear. The first experiments were disappointing, however, as after rising to a height of 10 metres the machine capsized and fell to the ground, being badly damaged, although the aviator escaped practically unhurt.

A Successful German School.

THE flying school started at Mulhouse by Amerigo is meeting with a good deal of success. One of the most successful pupils has been Schluter, who on the 5th inst. was flying for 52 minutes, while on the following day he made the necessary tests to qualify for his aviator's certificate, and finished up his period of tuition by flying for 1 hr. 18 mins.

Fatal Accident in Serbia.

WHILE giving demonstration flights before the Servian military representatives at Belgrade, the Austrian aviator, Rusyan, met with a fatal accident. He had made a flight of about a mile across the Save, which forms the Croatian frontier, and was returning, when the machine collapsed and fell to the ground. According to one account the propeller dropped off, while another report states that the wing snapped. When extracted from the remains of the monoplane the aviator was found to be seriously injured, and in spite of immediate medical attention, succumbed within a few minutes.

A New Voisin Machine.

AT the present time when most builders are abandoning the front elevator in favour of one placed at the rear, it is very interesting to notice that MM. Voisin Freres have turned out a biplane which is distinguished by the fact that it has an elevator in front, while there is an entire absence of any tail at the rear. From the accompanying photograph it will be seen that the monoplane elevator is placed a very long way in front of the main plane and that the rudder is also mounted above the elevator in front. The 50-h.p. Rossel Peugeot rotary motor and metal propeller are arranged at the rear edge of the main plane in very much the usual manner, and it will be noticed that lateral stability is maintained by means of balancing flaps at the ends of the main plane. The aviator sits some distance in advance of the main planes with the controlling levers of the usual type arranged in front of him. The position of the pilot is such that should any part of the engine break, it is extremely unlikely that it would injure him, while he is also able to get a good view of his surroundings. Needless to say the trials of this novel machine, seeing that it is the work of the Voisins, will be watched with great attention by all having any interest in aviation.

The main planes, which are placed 1.6 metres apart, have a span of 12 metres, while the chord is 2.2 metres, so that the bearing surface amounts to 26.4 square metres. The monoplane elevator measures 4 metres by 3.2 metres, and so the area is 12.8 square metres.

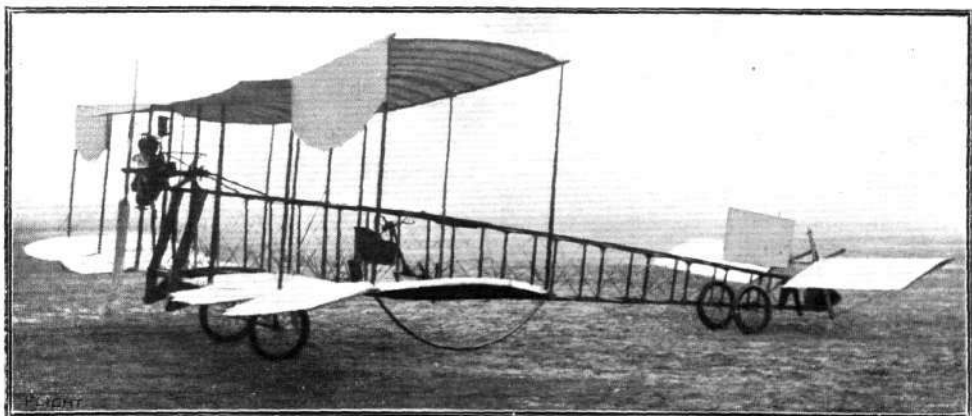


Remarkable "snap" of the Antoinette monoplane in mid-air during the recent disastrous and fatal accident to MM. Laffont and Mario Pola, showing a portion of the planes torn completely away. The tractor-screw, it will be seen, is still in revolution.

The fuselage, which carries the elevator in front and the motor and propeller at its after end, is a long rectangular framework mounted on a modification of the usual type of Voisin landing chassis while at its forward end are arranged a supplementary pair of wheels to assist in landing. In this connection it will be remembered that Santos Dumont's first successful flight was made on a biplane with a box form elevator mounted a considerable distance in front of the main planes, which gave the machine the appearance of flying tail first. This was illustrated in the *Automotor Journal* of November 24th, 1906.

Aviator Zselyi in Perfect Health.

THERE having been recently a deal of discussion in aeronautical circles as to whether the Hungarian engineer Zselyi (whose name has been variously given as Zosely and Josely) was killed last year, Mr. T. O'B. Hubbard, Secretary of the Aeronautical Society, wrote to the Austrian Aero Club to ascertain the facts. The reply is to the effect that although Aladore Zselyi was badly injured on June 1st, he was not killed and is now in perfect health.



THE LATEST VOISIN MACHINE.—View from the side of the latest biplane constructed by MM. Voisin Freres.

A Bavarian Circuit Race.

IN connection with the jubilee, and also the 90th birthday, of the Prince Regent, the Academy of Aviation at Munich is endeavouring to organise an aerial circuit race round Bavaria during the coming season. It is proposed that the race should be in seven stages, and starting from Munich on September 3rd, Nuremberg would be reached in three days, the intermediate stopping places being Ratisbonne and Bayreuth. One day would be spent at Nuremberg in giving exhibition flights, and then the competitors would make their way back to Munich, stopping *en route* at Wurzberg, Ansbach, and Augsburg.

Flying Over Dresden.

THE inhabitants of Dresden had their first opportunity of seeing an aeroplane overhead on the 6th inst., when Kahn, mounted on his monoplane, passed over the city and then flew out into the country. He eventually landed at Blasewitz owing to his petrol supply having run out. Herr Grade was also flying on his monoplane, and made a cross-country trip.

Flying at Calcutta.

A FINE flight was made by Mr. Henri Jullerot on his Bristol biplane, on the 6th inst., at Calcutta, when he flew over the racecourse for about ten minutes. The Lieutenant-Governor of Bengal, Sir Norman Baker, was among the spectators, who numbered about 100,000 persons, the native portion of the crowd being vastly impressed.

A Transatlantic Aeroplane.

NOTHING daunted by the failure of the Wellman airship to sail across the Atlantic, an American, Harry Grahame Carter by name, has announced that he will make an attempt to fly across the Atlantic in an aeroplane of his own invention. He has estimated that he can do the trip in 54 hours, and can carry sufficient fuel to do this in the hollow tubing of his machine. He hopes to be ready to start from Sandy Hook early in March. We fancy he is wrong in his starting date.



AIRSHIP NEWS.

The "City of Cardiff" Back in England.

AFTER having completed the task of sailing his airship to Paris, Mr. Willows intended to continue his journey to Pau, but on being reminded that if he stayed much longer in France he would have to pay Customs duty amounting to 743 francs, Mr. Willows decided on Saturday to deflate the balloon and send it back to London by rail. The several ascents he made during his short stay at Issy aroused a good deal of attention, and on his intention being announced much regret was expressed.

The Latest Austrian Dirigible.

THE third Austrian dirigible has now been completed, and by way of a trial trip, on the 2nd inst., it sailed from Fischamend to Vienna, the voyage occupying about three-quarters of an hour. So

Flying Above Charleston.

AN 18 year old aviator, James Ward by name, piloting a Curtiss biplane, flew over Charleston on the 7th inst. and won a prize of \$5,000 offered for the feat. His trip occupied 52 minutes and in the course of it he covered a distance of about 25 miles.

Flying at Buenos Ayres.

CATTANEO now has a strong rival at Buenos Ayres in Paillette, who on the 4th inst. was flying on his Blériot machine for more than an hour over Buenos Ayres. Rising from the Lugano Aerodrome he flew over to the racecourse on the other side of the city.

An Argentine Prize.

A PRIZE of £2,000 has been offered by the Argentine newspaper *Nacion* for a cross-country contest between Buenos Ayres and Rosario, a distance of 280 miles. The distance may be covered in three stages, and already three aviators—Cattaneo, Paillette and Andre—have entered.

Fatal Accident in Brazil.

AT the end of December the Italian aviator, Jules Picollo, arrived at San Paulo, Brazil, with his monoplane in order to give some demonstration flights. On the 28th ult. he made several short trial trips, and in the last was at a height of 400 ft. when the machine pitched forward and dropped to the ground, the aviator being killed instantly.

Mr. Vanderbilt Turns Aviator.

APPARENTLY failing to find as much fascination as of old in motoring, Mr. W. K. Vanderbilt is now turning his attention to aviation. He has, it is reported, ordered three Wright biplanes, which are to be specially built and be ready for delivery to him next spring. One of these will be of the ordinary standard type, the second will be a racing model of the "Baby" type, while the third will be similar to that on which Johnstone established his height record. The machines will make their first appearance at the Long Island Aerodrome, but as to whether Mr. Vanderbilt will pilot them himself no precise information is yet to hand.

successful were the results obtained that two more of similar type have been ordered to be put in hand at once. The airship is in appearance a combination of the Parseval and Lebaudy types. The length of the envelope is 58 metres, and it is 10'4 metres diameter at the largest part.

New Italian Airship.

UNDETERRED by the unfortunate accident which destroyed his dirigible just as it was completed last year, Signor Piccoli has had a new airship built, which will be known as "Ausonia No. 2." It is housed near Verona, and it is expected that it will make its first public appearance during this month. The envelope is 52 ft. in length and 25 ft. in diameter, while the weight is said to be about 8 cwt. It is confidently hoped that the new airship will prove very fast.



THE DALOZ COMPASS.

By RENÉ OZOUF.

IN Paris, at Christmastime, I found aeronautical circles sympathetically discussing the disappearance of Cecil Grace, and more often than not passing on to some remark about the Daloz compass, which appears to have attracted considerable attention over there, and to have met with some favour. In some respects the principle involved is not new, but I believe that this is the first time it has been given practical effect. Most readers of FLIGHT are probably acquainted with the basic idea of its use, which is that of steering a course in relationship to the direction in which objects on land are observed to pass beneath the machine in flight. For the purpose of intensifying this observation the Daloz compass is mounted upon a lens that forms the base of the instrument, and serves to facilitate an accurate observation of this relative motion. The compass itself consists of a magnetic needle and a mica disc. The mica disc is transparent, but is striped with a number of parallel lines.

When in action the disc and the magnetic needle move together, but means are provided whereby the disc can be adjusted relatively to the needle so that the lines on the disc may make any angle with the compass needle, which angle will be maintained permanently while the compass is in action.

Prior to starting a cross-country flight the aeroplane is placed on the ground pointing absolutely in the direction of its destination. The parallel lines on the mica disc are then adjusted so that the compass needle holds them truly fore and aft along the machine. When the pilot is in the air it is his sole duty, so far as the navigation of his course is concerned, to observe that the objects on land beneath him always appear to pass across the lens parallel with the lines on the mica disc. So long as they do this he is assured that his course is truly the same as that on which he started, for the lines on the disc make an invariable angle with the compass needle. Should the machine tend to drift with the wind a change in direction would be immediately noticed and the steering adjusted to make the necessary correction.

Unfortunately, of course, the Daloz compass does not overcome difficulties that are perhaps paramount on a big flight. Many pilots are suspicious of the reliability of a compass needle of any sort on their machines, others fly too high to properly see the things on earth, and others again may be making a sea voyage devoid of landmarks. One and all fear the danger of a flight in the fog, and few are sufficiently expert to keep a constant eye on the course, which alone will render this form of navigation accurate.

ASPECT-RATIOS.

By L. BLIN DESBLEDS, Lecturer in Aerodynamics, The Polytechnic.

It is with the object of trying to elucidate certain points in connection with the question of "aspect-ratio," which I have found to be commonly the source of confusion with students, that this note is written.

If a plane rectangular surface, A , moves in the direction of the arrow, the ratio of the length, L , to the length, l (Fig. 1), is

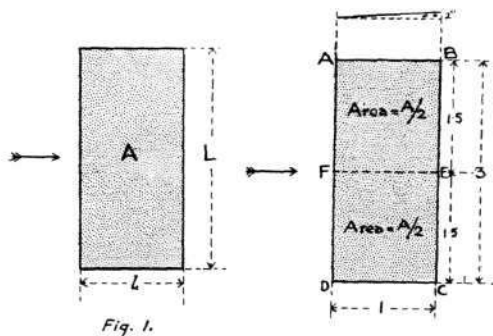


Fig. 1.

Fig. 2.

called the "aspect-ratio" of the surface. The length, L , is called the "span," and the length, l , the "chord," so that aspect-ratio = chord.

It is found that the aspect-ratio of a surface has a great influence on the resistance that the surface experiences when it moves through air. It is in order to take advantage of this influence that "sustaining surfaces" of aeroplanes are arranged to move broadside on.

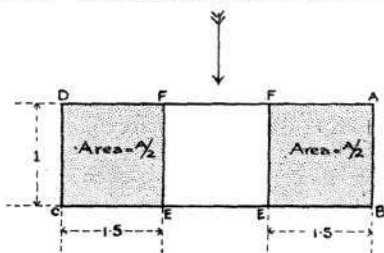


Fig. 3.

It was in order to determine in what way, and to what extent, this influence affected the resistance of a plane surface moving through the air that Soreau made his extensive experiments. From these he was able to obtain an expression showing how the air-resistance of a surface depends on its aspect-ratio.

In each case the air-resistance of a surface varies with a certain quantity, which he has called the "coefficient of influence of aspect-ratio." The "coefficient of influence of aspect-ratio" is denoted by the Greek letter λ . Its value may, in each case, be calculated by means of the expression

$$\lambda = 1 + \frac{1}{(1+m)^2} + \frac{2m}{1+m} \tan \alpha + 2 \tan^2 \alpha$$

where $m = \frac{\text{aspect-ratio} - 1}{\text{aspect-ratio} + 1}$, and $\alpha =$ inclination of the plane surface.

Bosch Magneto Successes.

As a proof of the popularity of the Bosch system of magneto it is interesting to note that 634,330 of them have now been sold. Bosch magnetos were fitted to the Howard Wright biplane on which Mr. Sopwith won the Baron de Forest Prize, and also on the Cody biplane on which Mr. Cody won the Michelin Cup. Other machines so fitted were M. Legagneux's Blériot, on which he beat

The expression for the air-resistance of a plane surface is then $R = \kappa \lambda A v^2 \sin \alpha$, where $R =$ resistance, $\kappa =$ coefficient of air-resistance, $\lambda =$ coefficient of aspect-ratio, $v =$ speed, and $\alpha =$ inclination of surface.

It must not be imagined that the coefficient of influence of aspect-ratio varies directly with the aspect-ratio. Thus if we have a surface, A , of aspect-ratio 1.5, and a surface, B , of aspect-ratio 3, the value of λ for B is NOT twice the value of λ for A . But if we work out the values of λ for aspect-ratios of 1.5 and 3 respectively, if the inclination of the plane is say 2° , we shall have for A , $\lambda = 2.4$, and for B , $\lambda = 3.09$.

Hence, if the surface $ABCD$ (Fig. 2) moves in the direction of the arrow, at an angle α , the air-resistance is measured by $R = \kappa \lambda A v^2 \sin \alpha = 3.09 \kappa A v^2 \sin \alpha$.

Now, if we bisect the surface $ABCD$ by the straight line EF , we shall have two surfaces $ABEF$ and $FEC D$ each of aspect-ratio 1.5 and of area $A/2$. So long as the two surfaces $ABEF$ and $FEC D$ are placed side by side, as in Fig. 2, such that when the surfaces are in motion no air can escape along EF , then we may consider the two surfaces to be equivalent to the whole surface.

If, however, the two surfaces, $ABEF$, and $FEC D$, are rigidly connected at a sufficient distance apart (Fig. 3), then the air-resistance to the motion of $ABCD$ is equal to the resistance to the motion of $ABEF$ plus the resistance to the motion of $FEC D$. But the resistance to the motion of $ABEF$ is equal to the resistance to the motion of $FEC D$. Therefore, the resistance to the motion of $ABCD$ is equal to twice the resistance to the motion of $ABEF$. That is resistance to motion of

$$\begin{aligned} ABCD &= 2(\kappa \lambda \frac{A}{2} v^2 \sin \alpha) \\ &= 2(2.4 \kappa \frac{A}{2} v^2 \sin \alpha) \\ &= 2.4 \kappa A v^2 \sin \alpha \end{aligned}$$

Now, if instead of placing the surfaces, $ABEF$, and $FEC D$, in the same plane as in Fig. 3, we place them one above the other, as in Fig. 4, at a sufficient distance apart and rigidly connected, then the air-resistance to the biplane thus formed is also twice the resistance to the motion of the plane $ABEF$,

$$\text{i.e.,} = 2 \times 2.4 \times \kappa \frac{A}{2} v^2 \sin \alpha = 2.4 \kappa A v^2 \sin \alpha$$

We thus see that a monoplane of aspect-ratio 3, of area A , and moving at a speed v at an inclination $\alpha = 2^\circ$, encounters an air-resistance $= 3.09 \kappa A v^2 \sin \alpha$; whereas a biplane of half the span of the monoplane, and of the same chord, moving under the same conditions of speed and inclination, has an air-resistance

$$\text{i.e.,} \begin{aligned} \text{res. of monoplane of area } A \text{ and aspect-ratio } 3 \\ \text{res. of biplane of area } A \text{ and aspect-ratio } 1.5 \end{aligned}$$

$$= \frac{3.09 \kappa A v^2 \sin \alpha}{2.4 \kappa A v^2 \sin \alpha} = \frac{3.09}{2.4} = 1.28$$

Hence, the monoplane which is equivalent to a biplane is NOT the monoplane obtained by placing the two surfaces of the biplane side by side.

Also the air-resistance to the motion of a monoplane of area A and aspect-ratio 1.5 is $\kappa \lambda A v^2 \sin \alpha = 2.4 \kappa A v^2 \sin \alpha$ = air-resistance to the motion of two planes, each of area $A/2$, and of aspect-ratio 1.5. Therefore the aspect-ratio of a biplane, just as the aspect-ratio of a monoplane, is = $\frac{\text{span}}{\text{chord}}$.

We thus see that a biplane will have the same lift and drift as a monoplane of the same area and of the same aspect-ratio.

the altitude record, and Mr. Henry Farman's biplane on which he improved the duration record.

Speed Alarm Competition.

SEVERAL readers still continue to submit designs for the above competition, which closed last October. We take this opportunity of drawing their attention to the fact, as the contributions in question cannot be acknowledged.

CORRESPONDENCE.

* * The name and address of the writer (not necessarily for publication) MUST in all cases accompany letters intended for insertion, or containing queries.

Correspondents communicating with regard to letters which they have read in **FLIGHT**, would much facilitate ready reference by quoting the number of each such letter.

NOTE.—Owing to the great mass of valuable and interesting correspondence which we receive, immediate publication is impossible, but each letter will appear practically in sequence and at the earliest possible moment.

THE WEISS MONOPLANE.

[1014] In a recent number of **FLIGHT** you state that I found the "Weiss" monoplane rather hard to turn. This was not so. In fact I found that it commenced very well, coming over to its own angle and maintaining its balance. The cause of my finding a roost in the softest part of the sewage farm was due to two compression struts not being up to their work.

The machine was otherwise most remarkable as a flyer, being as light as snow on the controls, and very steady. As you doubtless know, the Weiss has no warping or ailerons.

Shed 19, Brooklands. ERIC C. GORDON ENGLAND.

[We are extremely glad to have Mr. England's assurance, as we have great admiration for the perseverance of those associated with the Weiss machine. Possibly the distance somewhat deceived our correspondent in regard to his impressions.—ED.]

MAN-CARRYING GLIDER.

[1015] I notice with interest the letter from your correspondent, Mr. J. L. Elmslie, and should like to add a little to the information you give him, if I may be permitted to do so. I think he will find after his first few experiments that a more advanced type of machine is desirable, and for that reason it is advisable to keep the cost to a minimum. A machine of similar type I constructed about a year ago cost me about £6 for material, but if he is content to use bamboo and calico, which is quite serviceable enough for a start, he can keep his cost down to £3 or so.

In my opinion it is well worth while to gain preliminary experience upon a machine of this type and will save breakages, perhaps wreckage, to a second machine.

In the drawing he sends, if the shaded part is intended to indicate the pilot's seat it is in the wrong place; it should, of course, be at the front of the main plane, not the back, and in point of fact I think to do any free flying with this type he will have to lean right out forward even of this or his tail will not lift. Weight and size will preclude any such experiments as jumping off walls or fences, in fact he could not do it, for his tail would most certainly catch and break the outrigger spars. I think a slope of 1 in 7 or less would be better to start learning, but I agree with you that it will be necessary for a steeper incline to accomplish free flight.

If Mr. J. L. Elmslie cares to communicate with me I shall be pleased to give him any further assistance in my power, as a keen interest in the subject and some practical experience has brought me in contact with a considerable amount of useful information.

Dinant, Burnell Road, HOKACE W. H. VAUGHAN.
Sutton, Surrey.

AEROPLANE CONTROL.

[1016] On reading over a list of accidents that have happened to aviators during the past year I was much struck by the number that were evidently caused by the lack of sufficient control.

One which will illustrate my meaning, although not coming under the real heading of an accident, is perhaps worth mentioning.

Mr. T. Sopwith, at the end of his Channel flight, was reported to have said that the aeroplane canted up at a dangerous angle, under the influence of the rising wind, although the ailerons were drawn down as far as possible to counteract this turning moment. It was only by moving his body towards the rising side that he was again able to bring the machine back to its normal position. Had the disturbing force been suddenly, instead of slowly, applied, the machine must have overturned. It seems reasonable to conclude from this that the controls were inadequate, although the Howard Wright biplane is as well, if not better equipped in this respect than many others of this class.

To anyone who has studied bird flight it will be obvious that a gull or crow (I name these as being, I think, the most common gliding birds) has means of control far in excess of those of any aeroplane.

Either of these birds, gliding on a windy day, can be seen to alter the position of its wings or tail to an extent which must give, in proportion, a far greater righting effect than any control fitted to present day machines. In addition, they are able to perform feats of gymnastics in their efforts to right themselves quite impossible to man or his machine.

Another point I have noticed is this, the very early machines, which were notably fair-weather craft, had, practically speaking, the same sized controlling surfaces (or extent of warp in planes) as the modern machines, although these fly in winds many times greater. Had the speed increased in proportion this would have counteracted the greater effect of the wind owing to the increased effect of the controls at higher speeds, but this is not the case.

Against my argument will most likely be put the fact that greater controlling surfaces will require muscular exertion to move them in excess of the strength of a man. If this is the case, and at the same time greater control is necessary, some light relay mechanism worked from the motor shaft must be evolved so that the control levers would act in a similar manner to the steering apparatus on steamships.

I must apologise for the length of this letter, but in view of the rapidly increasing death-roll of aviation it seems a matter that requires urgently looking into.

Carlisle. E. TEMPLE ROBINS.

SIGNALS FOR FLYERS.

[1017] The mysterious disappearance of Mr. Cecil Grace has undoubtedly given cause for much speculation in aviation circles as to how, when and where the unfortunate flying man met his end. As a result one expects to see and hear suggestions to prevent a repetition of this form of accident. For my own part I firmly believe that had Mr. Grace possessed means of making his presence and approximate whereabouts known, he would still be with us to tell the tale. During his wanderings in the fog laden air, who can deny the possibility of his machine being at some period within—let us say a mile—of some point where assistance was in readiness, awaiting the call as it were, either on land or at sea.

As an example—during even hazy weather, near land and outside ports shipping would be at a standstill unless ships possessed means of signalling their presence and approximate position. The same example also applies to our railways. I would therefore suggest that every aeroplane, likely to encounter fog during flight, should be fitted with a powerful siren of great penetrating power and capable of being heard at a distance of at least 5 miles in still air. Such a siren could be driven off the engine and possibly the exhaust could be utilised. By a series of prearranged signals, in case of distress, communication could be established with land or ships at sea and assistance thereby readily obtained.

In the case of an aeroplane I am of the opinion that at present the satisfactory operation of wireless apparatus would not be possible by the pilot and would have to be entrusted to a passenger. Also this system as applied to aircraft can hardly be considered sufficiently advanced to be reliable.

In conclusion, I should like to state that my suggestion is quite simple and already proved practical, and I am certain it would be quite satisfactory and assist in extending the limits of the aeroplane's utility. Trusting you will deem this letter of sufficient importance to warrant publication in an early issue of your valuable paper.

C. WIGHTMAN,
Hon. Sec. Sheffield and District Aero Club.

AN AERIAL LEAGUE FOR PUTNEY AND FULHAM.

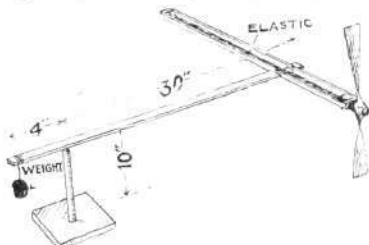
[1018] It is desired to organise in Putney and Fulham a branch of the Aerial League of the British Empire. May I appeal through the columns of **FLIGHT** to your readers in those districts, interested in aviation from a National point of view, for assistance in carrying on the League's campaign. Especially I would ask for help in forming a local committee, and shall be glad to hear from or see either ladies or gentlemen at the above address, when I will furnish them with all details.

It is hoped that a meeting and lecture will be arranged shortly.
F. J. SEAGAR-ANDERSON, late R.N.,
Local Honorary Secretary,
60C, Fulham Park Gardens, London, S.W.

TESTING MODEL PROPELLERS.

[1019] I enclose a sketch of an apparatus that may easily be constructed in half an hour, and should, I think, be useful for testing model propellers. I should be glad to have your opinion of the same.

The device consists essentially of a long boom, mounted on a pivot bearing, free to revolve horizontally. On one extremity of



this boom is mounted an elastic motor, in a similar manner to that generally in use on model aeroplanes, to which the propeller to be tested is fitted. The other extremity of the boom is counterpoised. Willenhall. F. LAW.

[The idea is worth developing, but the device in its present form does not afford either a direct or even a comparative measurement of thrust.—ED.]

CLAPHAM AERO CLUB.

[1020] Urgent appeal to residents of Clapham and adjoining districts.

The Clapham Aero Club is in great need of a few more members; will you become one of them?

You have only to pay a small entrance fee and thereafter a weekly fee of 3d. In return for this you get free use of the club workshop, which is situated at 140, Manor Street, Clapham High Street, where you can rely on finding almost any tool you can possibly require to make your models; also a locker is provided for each member, where materials may be kept. Second, free use of the club library, where may be found all works that are useful and are sold at a reasonable price; also *FLIGHT* and *Aero* weekly and *Aeronautics* monthly. Third, a series of very interesting papers, experiments, and competitions are now being arranged. Fourth, the club is in a position to offer its members materials at greatly reduced prices.

Is this not a very fair return for your 3d. weekly?

If you are interested write at once for fuller particulars to the secretary.

J. DOLLITTLE, Hon. Secretary.

1, Avondale Mansions, Bromells Road,
Clapham, S.W.

TWIN-SCREW MODELS.

[1021] I have been an interested reader of your excellent paper for some time, and noticed in your issue of November 5th two letters (Nos. 875 and 876), showing diagrams of two model monoplanes of a type which seems to be most efficient and at the same time the most simple. But I should like to know why the makers of these two models (and also of the model on p. 906) fit their propeller-shafts at an angle to each other. Would they not be much more efficient if made parallel, as then each propeller would thrust in a direct line with the model's flight? Could the owners inform me whether they use wood or fabric for their planes?

I have experimented with a number of small models of various types which I have made myself, but in all cases I find that, with a single propeller or tractor-screw, the models overturn, on account of the reaction of the elastic. Could any of your readers tell me how to obviate this without fitting two propellers?

Over, near Winsford.

PERCY VEE.

MODEL FLIGHT.

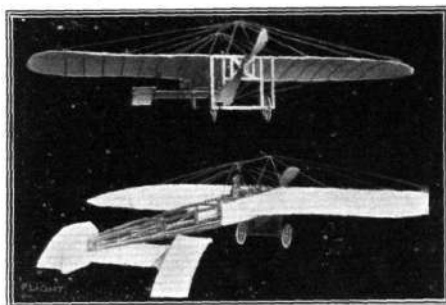
[1022] With regard to the duration of model aeroplane flight, letter 821, it depends greatly on the size of your aeroplane and what motive power you have. On an average a model will fly for 30-40 secs., or, in some cases, 50 secs. If your model flew for 40 secs. it could be considered good. Nearly all competitions for models have a competition for the model flying longest in the air.

Dorking.

J. BARGMAN.

MODEL BLÉRIOT.

[1023] I have pleasure in enclosing photos of a $\frac{1}{8}$ -scale model Blériot I have just completed. I fitted it with a model Gnome

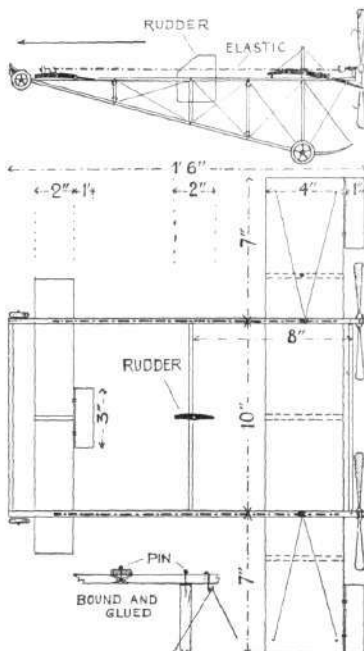


motor and petrol tanks, &c. The propeller is a 9-in. Aerospeed, which I bought from A. Melcombe, Bedford. The frame is made from $\frac{1}{4}$ -in. square poplar wood. Swansea.

A. P. BROWN.

MODEL VALKYRIE.

[1024] I enclose drawings of a model aeroplane. Will you do me the favour of reproducing same in your valuable paper, which I consider so excellent? The model may be of interest to others. I



am rebuilding it now on a larger scale. I used grease-proof paper and best fretwork wood cut with a machine. The joints are pinned together.

Macclesfield.

C. C. HORNER.

MODEL CONSTRUCTION.

[1025] Will you through your valuable paper inform me how to fasten the canvas to the ribs of my model aeroplane, as I cannot tack the fabric to them as they are only $\frac{1}{8}$ in. thick? Will you or any of your readers inform me, and get me out of the difficulty? Do you think sticking them with solution is sufficient for under the ribs to keep the camber in the cloth?

Macclesfield.

W. GALLIMORE.

[They may be stuck, or—if it is desired to take the model to pieces again—preferably stitched down with thread.—ED.]

IMPORTS AND EXPORTS, 1910.

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910).

Imports.		Exports.		Re-Exportation.	
	£		£		£
January ...	2,516	January ...	750	January ...	550
February ...	437	February ...	2,950	February ...	—
March ...	7,516	March ...	128	March ...	600
April ...	6,305	April ...	950	April ...	1,470
May ...	846	May ...	400	May ...	350
June ...	7,961	June ...	642	June ...	558
July ...	11,608	July ...	336	July ...	830
August ...	6,188	August ...	812	August ...	1,455
September ...	1,034	September ...	4,340	September ...	1,668
October ...	2,816	October ...	270	October ...	2,211
November ...	3,941	November ...	251	November ...	1,655
December ...	5,038	December ...	3,257	December ...	850
12 months...	56,206	12 months...	15,486	12 months...	12,197

PUBLICATION RECEIVED.

The Theory and Practice of Model Aeroplaning. By V. E. Johnson. London: E. and F. N. Spon, Ltd. Price 3s. 6d. net.

DIARY OF COMING EVENTS.

Note.—Some of the dates are at present provisional only. The references in brackets are to where details of the respective events have appeared in FLIGHT.

British General Events.

Mar. 10-18	Olympia Aero Show.
July	Daily Mail Round England Contest.
July	Gordon-Bennett Aviation Cup Contest.
Oct. 31	Clo-e of British Michelin Cup.

British Clubs and Associations.

Jan. 12	"Design and Flying of Model Aeroplanes." Paper by Mr. W. Rowland Durr at Central Hall, High Street, Peckham.
Jan. 18	"Motive Power in Aeroplanes." Paper by Capt. A. D. Carden, R.E., at Northampton Institute.
Jan. 20	"Conquest of the Air and Problems." By A. E. Berriman, at Manchester A.C.
Jan. 24	"Aerial Travel." Lecture by Miss Gertrude Bacon at Ladies' A.C.
Jan. 25	"Lines of Aeronautical Research." By Mr. B. G. Cooper at Northampton Institute.
Jan. 28	Aeronautical Society Visit to Teddington National Physical Laboratory.
Jan. 30	"Art of Aviation." Lecture at London Institution by Mr. Robert W. A. Brewer.
Jan. 31	Royal Aero Club Annual Dinner, Prince's Restaurant.
Feb. 14	"Pressure on Planes and Curves." By Mr. F. Handley Page at Royal Society of Arts.
March	Annual General Meeting, Aeronautical Society.

Foreign Fixtures.

April 9-21	German Circuit—Ulm, Frankfurt, Friburg, Strasburg, Carlsruhe, Mannheim, Wiesbaden (1016).
April 16	Dresden Meeting.
April 27-May 16	German National Circuit—Aix-la-Chapelle, Cologne, Essen, Bielefeld, Brunswick, Berlin (975).
June 4-12	Johannisthal National Meeting.
June 6-11	Rome Circuit.
June 12-18	Rome-Turin race.
June 18-24	Meeting during Kiel Regatta.
June 19-26	Turin Aviation Week.
June 23-27	Circuit Kiel—Berlin.
July	Italian Circuit.
July 1-13	Circuit Berlin—Hanover—Hamburg.
Aug. 5-11	Belgian Circuit from Brussels.
Aug.	O-tende Circuit.
Sept. 1-17	Hartz Mountains Flight.
Sept. 3-10	Aviation Circuit of Bavaria, Munich, Ratisbonne, Bayreuth, Nuernberg, Wurzburg, Ansbach, Augsburg, Munich (38).
Sept. 24-Oct. 1	Johannisthal National Meeting.
Dec. 31	Clo-e of International Michelin Cup.

Dates not yet fixed or still open without date limit.

French National Aviation Cup (Paris-Orleans, 10,000 francs).
Circuit Paris—Berlin—Brussels—London—Paris.
Prix de l'Avion (Bordeaux—Paris, 10,000 francs).
Prix Daufryel (Bagatelle—Havre—Ste Adresse, 10,000 francs).
Prix René Quintin (quarter hour glide with motor stopped, 10,000 francs).
Lisieux Circuit—round Lisieux (5,000 francs).
Pic du Midi to Bagnères-de-Bigorre (10,000 francs).
French Minister of Public Works Prize (for French Con tructors, 20,000 francs).
Paris—Pau (20,000 francs objet d'art).
Prix du Grand Ecart (Slowest and Quickest Speeds).
Prix Quentin Bauchard (Paris Municipal Council, 50,000 francs).
South of France Prize (Paris Municipal Council, 200,000 francs).
Calais—Dover—Doulogne—Folkestone (300,000 francs).
Biarritz—Pau—Toulouse—Bordeaux—Marseilles—Nice—Bastia and back (100,000 francs).
Nice—Lyons and back.
Tunis—Nice and back.
Aix les Bains Meeting (200,000 francs).
French Military Competitions (1,200,000 francs).
Michelin Grand Prix (Paris—Clermont Ferrand, 100,000 francs).
Deutsch de la Meurthe Channel Flight.
Deutsch de la Meurthe Round Paris (200 kiloms.) Prize, (70,000 francs).

RECORDS.

Duration.—Henry Farman (France), at Etampes, on a Henry Farman biplane fitted with a Gnome motor: 8 hrs. 12 mins., covering 463 kiloms. (288½ miles).

Distance.—Maurice Tabuteau (France), at Buc, on a Maurice Farman biplane, 584,935 kiloms. (365 miles) in 7h. 48m. 31½s.

Altitude.—G. Legagneux, at Pau, on a Blériot monoplane with Gnome motor: 3,200 metres (10,746 ft.).

Speed.—A. Leblanc (France), on a Blériot monoplane, fitted with Gnome motor, 5 kiloms. in 2 mins. 45½ secs. = 108 k.p.h. (67.5 m.p.h.).

Straight Line (not recognised by F.A.I.).—J. Radley (Great Britain), at Lanark, on a Blériot monoplane with Gnome engine: 1 mile in 47½ secs. = 75.95 m.p.h.

Aeronautical Patents Published.

Applied for in 1909.

Published January 12th, 1911.

29,372. J. W. WILSON. Aeroplanes.

Applied for in 1910.

Published January 12th, 1911.

2,095. E. W. TWING. Aeroplane.
13,208. E. C. A. BAUMANN AND E. E. FREYTAG. Aeroplanes.
14,455. J. WOJCIECHOWSKI. Propellers for aerial machines.
19,017. J. WETTERDAL. Steering airships and aeroplanes.

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